# ESSAYS AND NOTES

ON

# HUSBANDRY

AND

# *RURAL AFFAIRS.*

By J. B. BORDLEY.

Still let me Country Culture ſcan:
My Farm's my Home: "My Brother, Man:
"And God is every where."

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# PREFACE.

THE writings of the reſpectable Mr. TULL, firſt excited the author's attention to agriculture: but, to Mr. YOUNG he is moſtly indebted for his knowledge of its preſent ſtate and the modes of practice in Europe. It was a happy firſt thought which led Mr. Young to make his farming-tours, for collecting *facts* of the then exiſting ſtate of huſbandry in England: the reſt followed; and the world has the fruits of his labours, his ingenuity, and his public ſpirit.

On

On the turn of middle age and whilſt gradually quitting public employments, the author ſat down on a farm in Maryland, and became enthuſiaſtically fond of huſbandry. Farmers in the neighborhood informed him of their modes of practice; but they taught him nothing of the principles of the art. Whilſt they knew how to practiſe in the manner common to the country, he knew neither principles nor practice; but began however with obſerving their practices, which he continued to imitate; until gaining information from a number of inſtructive experiments, he was encouraged to deviate from ſome of them; and became more and more aſſured that great improvements might be made by profeſſed farmers, in this firſt of all employments, if they could be brought to relinquiſh the worſt of their habits.

It was hoped the Society of Agriculture in Philadelphia would have induced farmers, in Pennſylvania at leaſt, to ſeek improvement

provement in better practices. Succeſs was chiefly looked for from perſons who becoming farmers had been of other profeſſions (ſoldiers, ſailors, &c.) and were never trained to follow mere habits,—— unexamined; and moreover whoſe ſupport ſhould not altogether depend on the produce of their farms; but with minds unſhackled, would practiſe upon well digeſted and approved principles teſted by experiments.

Little eſſays have been occaſionally written and diſperſed amongſt his friends; which, with others hitherto remaining in manuſcript pertaining alſo to the concerns of huſbandmen and country affairs, compoſe the preſent work. If fortunately they ſhall induce improvements and better attentions, for aſſuring competency with domeſtic and ſocial comforts, his firſt wiſh will be accompliſhed.

CONTENTS.

# CONTENTS.


| | Page. |
|---|---|
| I. *Systems and Rotations* | 1 |
| II. *Graſs-rotations* | 3 |
| III. *Grain-rotations* | 22 |
| IV. *Deſign for a Grain Farm* | 57 |
| V. *Grain and Meadow-rotation* | 65 |
| VI. *Farm-Yard* | 84 |
| VII. *Clover* | 98 |
| VIII. *Wheat on Clover* | 107 |
| IX. *Beans* | 115 |
| X. *Maize and Wheat-culture* | 116 |
| XI. *Hemp* | 126 |
| XII. *Farm-yard Manure* | 139 |
| XIII. *Barns* | 158 |
| XIV. *Cattle Stalls* | 165 |
| XV. *Cattle Pastured and Soiled; Kept and Fattened* | 168 |
| XVI. *Obſervations on Cattle, Sheep, and Hogs* | 190 |


XVII.

XVII. *Maize and Potatoes as Fallow-Crops and Fattening Materials* 227
XVIII. *Fences* 234
XIX. *Treading Wheat* 245
XX. *Method of Registering Experiments* 258
XXI. *Principles of Vegetation* 270
XXII. *Neceſſaries best Product of Land* 299
XXIII. *Family Salt* 318
XXIV. *Rice* 335
XXV. *Country Habitations* 338
XXVI. *Ice-Houſes* 364
XXVII. *Intimations on new Sources of Trade, &c.* 371
XXVIII. *Potato-Spirit and Beer* 386
XXIX. *Diet in Rural Economy* 399
XXX. *Gypſum Manure* 417
XXXI. *State Society of Agriculture* 434
XXXII. *Notes and Intimations* 451

## *ERRATA.*

Page 68. line 3 from bottom, for *covered* read *ſmothered.*
303. For *Columal* read *Columel.*

To the Explanation of the Cuts, add ——— *e.* Kitchen Garden, ——*f.* Nurſery and Truck-patch.

Plate II. fig. 6. Ice-houſe referred to in page 367. The Ice being contained within a Log Pen, under ground, and inſulated with Straw.

Page 73. Fill up blank with 190.
256. Say, III.

# ESSAYS AND NOTES

ON

# HUSBANDRY, &c.

## SYSTEMS AND ROTATIONS IN FARMING BUSINESS.

FARMERS bleſſed with diſpoſitions to improve on what they know, will acknowledge there are great deficiencies in the modes of common farming, for want eſpecially of well digeſted ſyſtematic applications of labour with a proper choice of crops; and that, there are great irregularities and miſapplication of labour and attentions in the practices of huſbandmen.

It is not long ſince we began to read and talk of *rotations of crops*, without applying any adequate meaning to the expreſſion. It ſeems as if farmers, in common, underſtand little more by it than the practices or courſes, irregular and wild as they are, in common farming. They indeed are not apt to elevate their minds to views of improvement; but rather ſet themſelves againſt it: for, improvement implies new labour and attention; although it may be in lieu of and leſs than the uſual courſe of labour; and they cannot give up their old habits, already and inſenſibly acquired without any expenſe of thought.

A *recurring rotation of crops* is the completion of as many years crops of the ſame kinds, in regular changes from field to field, as there are fields cultivated; and which form a cycle or round of ſuch crops as will recur in the ſame order for ever. But where, for inſtance, there are ſeven fields, if the farmer proceeds on the deſigned ſyſtem, but ſtops ſhort of the ſeven years, it is not a *rotation*,

*rotation*, but is only a *courſe* of crops for ſo many years as it has been continued; for there is no cycle or round of crops completed.

Experience teaches, and a little reflection on viewing deſigns of ſyſtematic recurring rotations of crops and buſineſs, aſſures thinking perſons that well choſen ſyſtematic buſineſs muſt have important advantages over random practices and courſes.

## GRASS ROTATIONS.

A valuable friend of the ſocial virtues, the late Mr. *Rigal*, a gentleman from Manheim in Germany, aſked me how he ſhould cultivate a ſmall farm near ſo conſiderable a town as Philadelphia. On which the following was written for him; and it is here inſerted entire, becauſe of the principles and intimations contained in it, which may alſo be uſeful, as well as the ſyſtem of buſineſs propoſed.

" ——Commerce feeds the paſſions:
" Agriculture calms them."

Intending to retire from the buſtle of a town life, to a ſmall ſeat, a few miles in the country, conſiſting of a comfortable houſe, offices, garden, and 56 acres of arable land having a clay-loam rather impoveriſhed, but knowing nothing of huſbandry from experience, and but little in theory, I conſult practical farmers; who aſſure me labour is ſcarce, hirelings are with difficulty managed, even by experienced huſbandmen, and that many peculiar attentions with much of complicated work are appendant to a *grain farm*. In ſhort, that the moſt ſimple, the moſt pleaſing, and the moſt advantageous uſe that I can apply my land to, is to keep it in graſs.

It is alſo ſaid that ſome ſuch mode as is offered in the deſign below, is beſt adapted to my talents and ſituation. It is my wiſh, however, to have it approved or amended by experienced perſons, or that a better be propoſed.

DESIGN.

## DESIGN.

No kind of grain is to be cultivated. No horſe, ox, cow or other beaſt is to graze on paſture. They are to be kept up the year through. There then will be little need of diviſion fences. Such as are on the place may be removed, and the out fence be made perfect. The fields will then be under one general incloſing fence; and exhibit a beautiful unit of graſs, unbroken by fences, but dotted here and there with clumps of trees, and marked off in equal diviſions by headlands or turnings, and cultivated as below.*

The

* The trees may be locuſts, ſugar-maples, black mulberries, black-walnuts, black-gums, dogwoods, ſaſſafraſſes: none whereof materially injure graſs growing under them. If it ſhould be requiſite to guard againſt bleak winds, diviſions may be formed with hedges, or only trees planted cloſe in rows. Other trees may be two or three weeping-willows, for their ſingularity; the yellow-willow for uſe. The ſugar-maple is a handſome clean tree, which gives a deep ſhade. A grove of them, two or three acres, would give comfortable ſhady walks, and ſugar for family uſe; the making whereof would require but a ſhort time, and be an entertaining harveſt. The trees 30 feet apart, are above 140 on an acre; which at

The live-ſtock may be two oxen for a plow, harrow and cart, occaſionally; four oxen in harneſs for a waggon, the journies being ſhort; and two good cows, beſides carriage or ſaddle horſes.* Much of in-con-

the loweſt reckoning would yield 200 lb. of ſugar an acre. Two acres, yielding 400 lb. would pay an annual rent of 30 or 40 Dollars an acre, deducting only a trifle, not ſo much for labour as for a ſhort attention in the leiſure month of February. From ſeeds, it may be 20 years before the trees yield ſufficiently of ſugar: but they ſoon form a delightful ſhady grove.

* Mr. Rigal for whom this was written, lately died in eaſy circumſtances. Others, leſs able, may conduct the buſineſs of their graſs-farms with fewer draught cattle, and even without owning any, by occaſionally hiring teams, for drawing hay, carrying out manures, plowing, &c. But, four oxen, a waggon, a plow and a harrow, would pay well when kept on the farm, always at command. Indeed oxen cannot be deemed coſtly, expenſive, and in the end a dead loſs, as horſes are.

| | | |
|---|---|---|
| An ox coſts . . . | 40 Dollars. | |
| ——3 years keep, at 24 . | 72 | |
| ——1 year ditto, and fatting . | 40 | |
| He gains from 4 years but partial work . | | 160 |
| ——4 years dung (winter and ſummer) . | | 40 |
| ——ſold, for firſt coſt 40 and increaſe 4 years 40 . . . . | | 80 |
| | 152 .. | 280 |

convenience and but little profit would attend the making butter for ſale, by any other than a proprietor who is of the claſs of dairy people. Rather prefer buying butter and grain wanted. The *hay*, a ſimple unit of attention and produce, pays for them to the beſt advantage; and a complication of attentions is to be avoided. But, if butter muſt be made on ſuch a farm, let it be no more than for family conſumption.

Some ground for potatoes, truck-patch, and experiments will be wanted: therefore eight acres are reſerved; which are to have no connection with the other fields; nor are ever to grow any corn or grain, which would require the *thraſher* to be introduced. Theſe eight acres may contain a garden for the market, or for pleaſure, according to the views of the owner.

In the firſt year plow up all the arable, deep as the ſoil will admit of. Then ſow buckwheat, and plow in the plants before they

they produce ſeeds. Repeat this, for *protecting* the fallow from exceſſive exhalation; and for adding a *manure* to the ſoil as often as the buckwheat is plowed in. On the fields A and B, lay a quantity of rich *dung*: beſt done in the fall, on the laſt turning in of the buckwheat. Sow theſe and the other four fields with rye, for giving *hay*. When, hereafter, clover and timothy ſeeds are ſown, rye will firſt *ſhelter* theſe graſſes in their tender ſtate, and then be cut and cured into *hay*. In the ſecond year, give dung alſo to C and D fields; and in the third to E and F fields. I have not indeed ever ſeen rye-hay; but have heard farmers ſay, it is good in quality and the crop great.

To *dung* the whole in the firſt year might be beyond your power, or be very inconvenient. Therefore a third part is propoſed to be dunged in each of three years: which, however, rather diſadvantageouſly poſtpones, till the ſeventh year, the commencement of the deſired courſe, for giving yearly

ly *two fields of rye-hay*, *two of clover*, and *two of timothy*.*

For effecting rotations of recurring crops, four articles of produce, if *all annual*, would require four fields. If of *three articles* of crop, *one* is *annual*, as in the ſubſequent table, and *two* are *biennial*, then ſix fields are requiſite. With fewer fields the ſyſtem would be defective, and the round of crops could not be continued. For inſtance: if theſe articles, annual and biennial, as above, were cultivated in only three fields, in the ſeventh and eighth years there would be no clover. If of *two* articles of crop one is *annual* and the other *triennial*, then four fields are requiſite.

The

* If the ground is already in good heart, after plowing in the firſt ſowing of buckwheat for a manure, in *July* you may ſow buckwheat *for a crop*, and *clover ſeed* immediately on it. Thus in the very firſt year, a crop of buckwheat is gained; and in the ſecond year a crop of clover, from the whole 48 acres. If the ground is ſuitable to *gypſum*, then reſtore with gypſum duſt as far as the dung falls ſhort, which will greatly reduce the poſtponement of the intended graſs-crops.

The firſt ſix years of the above deſign are rather preparative to the intended round of crops (ſee the table). It is the ſeventh year which enters upon the deſigned and proper recurring rotation of *crops*, *manuring*, and *work*. A regular ſyſtem of recurring crops and buſineſs in huſbandry exiſts on the principles of the ſpiral line, as well as of the circle. This is illuſtrated by reading the plan diagonally, from A field in the ſeventh year, downward through B field 8, C field 9, &c. to F field in the twelfth year incluſive; being in all ſix fields, and ſix years; all whereof direct to "mow timothy, plow in timothy, dung, ſow rye." The like of the other articles. By wrapping the paper plan or table round a cylinder, the ſpiral line of crops is clearly underſtood. The plan is alſo advantageouſly read directly downward, taking any one field at a time; and alſo laterally through all the fields of either year.

Though the firſt ſix years, in the ſyſtem exhibited in the table, give crops, except the

the firſt year, yet they are not according to the deſigned variety; as they are moſtly in rye-hay, inſtead of two fields of *rye*, two of *clover*, and two of *timothy*. But the proper courſe being once entered on, the intended crops will regularly recur as long as you pleaſe to continue it.

*Manurings* alſo recur in rotation and ſpiral order; and being frequent are applied in leſs quantities at a time than would be requiſite after the uſual lengthy delays in renewing them: and alſo applying them *frequently in moderate quantities*, approaches nearer to the economy of nature; which conſtantly commits to the earth the food of plants, or the means of obtaining that food, in moderate portions: not in gluts to ſurfeit, nor at diſtant intervals of time which might ſtarve the plants.

Not only the *crops* and *manurings*, but the *plowings* and the work in general, recur orderly and of courſe, without the hazard of a wrong bias or fallible reaſoning leading you into

into error, confuſion, or ill judged and irregular practices and courſes. Such are important advantages, which ſyſtematic huſbandry has over random or common practices.

Your live ſtock will give the dung requiſite, after the third year: and beeves bought and ſoiled on cut green graſs, will add to the dunghil.

Rye is ſowed in September or October. Clover in Maryland, in March, by ſtrewing the ſeeds on the ground which is already ſown with ſmall corn, without any attempt to cover them. The dilated ſtate of the ground, and the motion given to its particles by the alternate light froſts and thaws of the ſeaſon, ſuffice for the growing of the ſeeds; and the ſun is too feeble to injure them in that early month, ſheltered too as they are by the wheat or other cornplants. Some farmers in Pennſylvania of late, prefer ſtrewing clover ſeed on their wheat fields in April. For the climate of Maryland about the 20th of March ſeems the beſt time.

Timothy

Timothy ſown in the ſpring, would ſometimes be injured by drought and heat, of the midſummer ſun, whilſt in its feeble ſtate, on the loſs of its grain-ſhelter. On the other hand, though timothy is more perfect from being ſown on grain in autumn, yet it ſometimes overgrows and injures the crop of grain. But when the grain is ſown for the purpoſe of *hay* and *ſhelter* only, the objection is avoided: and autumn is generally the preferable ſeaſon for ſowing *timothy* ſeed. On rye being, in September, ſown and harrowed in, immediately, before the ſoil can be ſettled down by time or rain, ſtrew the timothy ſeed over it; and either roll it in or leave it to the crumbling of the ſoil in its ſettling with the aid of wind and rain; which in experience is found to be ſufficient.

*Clover* and *timothy* grow admirably well when ſown in *July* on *Buckwheat*. The ſeedling plants are thus well ſheltered againſt the ſcorching ſun, and will have a good length

length of time for growing ſtrong for withſtanding the winter's froſts.

Two years are the moſt that clover ought ever to be continued in the ground. Timothy would continue good ſeveral years longer. But this is of no conſideration in a rotation courſe, which does not well admit of any graſs or clover being continued two years on the ground: and it is of great advantage to turn up the ground, ſhift its ſurface, and bury the ſods of graſs. The expenſe of ſeed for renewing graſs is thought too much of by farmers. It is a trifle, when oppoſed by the advantages gained.

The following rotations further illuſtrate the aforementioned principles; and ſhew other varieties of crops.

| *Clover*, with Rye. | | *Timothy*, with Rye. | | *Clover* and *Timothy*, without ſhelter. | |
|---|---|---|---|---|---|
| 1ſt Round of Crops. | RCC<br>CRC<br>CCR | 1ſt Round of Crops. | RTTT<br>TRTT<br>TTRT<br>TTTR | 1ſt Round of Crops. | CTCT<br>CTCT<br>TCTC<br>TCTC |
| 2d. | RCC<br>CRC<br>CCR | 2d. | RTTT<br>TRTT<br>TTRT<br>TTTR | 2d. | CTCT<br>CTCT<br>TCTC<br>TCTC |

The

The want of a ſheltering crop to the young clover and timothy, in moſt years might prove very material.

In the inſtances where *timothy* is propoſed, *orchard graſs* may be ſubſtituted.* In ſome particulars they have a ſimilarity of character: in others they materially differ. Both are blade or ſpire graſſes, tufty and fibrous rooted. Their principal difference is in the forwardneſs of their ſpring growth, the time of their arrival to maturity, and their continuance towards winter. *Orchard graſs* comes early, is matured ſoon, and continues green late in the ſeaſon; juſt as clover does. *Timothy* is late in its coming in the ſpring, and late in ripening.

It is not uncommon in the ordinary huſbandry, to ſow lots of ground with clover and timothy ſeeds, mixed. But a better companion

* It is ſaid there is a graſs called orchard graſs in England; which from the deſcription given me, is very different from the orchard graſs of America—ſo called from its growing better under trees than other graſs.

companion for clover is orchard graſs. Yet in a rotation ſyſtem, clover ought not to admit any kind of graſs ſeeds to be mixed with it.

When clover is grown, it muſt be cut: it ought to be ſooner than is uſual. Timothy growing with clover, is cut with it, in a young and very imperfect ſtate. In this caſe the clover gives matured hay: the timothy a crude food containing little of nouriſhment. Horſes prefer ripe, full-grown timothy in hay. Mr. Gettings, of Gunpowder Foreſt, Maryland, preſſed with work, could mow but a part of his timothy before harveſt. He ordered the pretty green hay from this mowing ſhould be reſerved for his favourite horſes. His hoſtler informed him, they preferred the brown hay cut after harveſt; and he ſaw and was ſatisfied of the fact. Afterwards, Col. Lloyd, of Kent, cut a part of his timothy before harveſt, and the reſt in July after harveſt. He attended to the feeding his horſes with theſe, in conſequence of what he had heard of

of Mr. Getting's experiment, and aſſured me his horſes preferred the browniſh matured hay to what was cut before harveſt.*

* "In ſome meadows I ſaw timothy graſs ſtanding very thick and high; and cloſe to it, it was much thinner. On inquiry, I found the part where it was *thin* had been mowed *twice*; and what ſtood thick had been mowed *once* only, and that *after wheat harveſt*. Mowing timothy only *once* in a ſeaſon, and that *after harveſt*, gains almoſt as much as if twice mowed (once before harveſt, and once again in autumn): beſides, horſes and cattle will eat *ripe timothy* when they will not look at the other." Journ. from Hope, in New Jerſey: Columb. Mag. Sept. 1788, p. 502.

*TABLE OF THE COURSE OF CULTIVATION AND OF CROPS:*

| Year | A | B | C | D | E | F | Crops. |
|---|---|---|---|---|---|---|---|
| 1 | Fallow, 8a. Plow in Bw.* Dung. Sow Rye.† | Fallow, 8a. Plow in Bw. Dung. Sow Rye. | Fallow, 8a. Plow in Bw. repeatedly. Sow Rye. | Fallow, 8a. Plow in Bw. repeatedly. Sow Rye. | Fallow, 8a. Plow in Bw. repeatedly. Sow Rye. | Fallow, 8a. Plow in Bw. repeatedly. Sow Rye. | None in this year. |
| 2 | Sow Clover. Mow Rye. Gypsum. | Mow Rye. Plow in Bw. Sow Rye. | Mow Rye. Plow in Bw. Dung. Sow Rye. | Mow Rye. Plow in Bw. Dung. Sow Rye. | Mow Rye. Plow in Bw. repeatedly. Sow Rye. | Mow Rye. Plow in Bw. repeatedly. Sow Rye. | RRRRRR |
| 3 | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Rye. Plow in Bw. Sow Rye. | Mow Rye. Plow in Bw. Sow Rye. | Mow Rye. Plow in Bw. Dung. Sow Rye. | Mow Rye. Plow in Bw. Dung. Sow Rye. | CRRRRR |

* Buckwheat.

† Not Ray or Rye *Grass*; but Rye *Corn*; to be cut and cured into *hay*, when the heads are shooting out of the sheath.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Rye. Plow in Bw. Sow Rye. | Mow Rye. Plow in Bw. Sow Rye. | Mow Rye. Plow in Bw. Sow Rye. | CCRRRR |
| 5 | Mow Rye. | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Rye. Plow in Bw. Sow Rye. | Mow Rye. Plow in Bw. Sow Rye. | RCCRRR |
| 6 | Mow Tim. | Mow Rye. | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Rye. Plow in Bw. Sow Rye. | TRCCRR |

## *TABLE CONTINUED; IN RECURRING ROTATIONS.*

| *Year* | A | B | C | D | E | F | *Crops.* |
|---|---|---|---|---|---|---|---|
| 7 | Mow Tim. Plow in Dung. Sow Rye. | Mow Tim. | Mow Rye. | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | Sow Clover. Mow Rye. Gypsum. | TTRCCR |
| 8 | Sow Clover. Mow Rye. Gypsum. | Mow Tim. Plow in Dung. Sow Rye. | Mow Tim. | Mow Rye. | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | RTTRCC |
| 9 | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Tim. Plow in Dung. Sow Rye. | Mow Tim. | Mow Rye. | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | CRTTRC |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10 | Mow Clover. Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Tim. Plow in Dung. Sow Rye. | Mow Tim. | Mow Rye. | CCRTTR |
| 11 | Mow Rye. | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Tim. Plow in Dung. Sow Rye. | Mow Tim. | RCCRTT |
| 12 | Mow Tim. | Mow Rye. | Mow Clover Plow in Lime. Sow Rye. Sow Tim. | Mow Clover | Sow Clover. Mow Rye. Gypsum. | Mow Tim. Plow in Dung. Sow Rye. | TRCCRT |

GRAIN

## *GRAIN ROTATIONS.*

If reducing the cultivation of *graſs* to regular ſyſtematic rotations be advantageous, how much more ſo muſt it be to apply ſuch rotations to the more complicated and various buſineſs of *grain farms!*

### *Of the Engliſh Old Courſes of Crops.*

Until about the middle of the preſent century, one of the beſt common courſes of farming, in England, conſiſted of a *fallow*, which broke up and cleaned the ground, by ſeveral plowings, but left the ſoil expoſed to the ſcorching ſun, during the hotteſt ſeaſon, without any ſhading crop, and on this *wheat* was ſown; *peas* or beans following the wheat: then *barley* (or oats or both) in ſucceſſion, on one moiety of the farm, during ten to twenty or more years: the other moiety during that time

time being in common paſture graſſes.* When a change was to be made, the moiety in graſs was plowed and prepared; and then thrown into the courſe of crops as above; and that which had been in crops, was ſown with mixed graſs ſeeds (not clover) to lay as before ten or twenty years. The whole arable or plowable part of the farm thus divided into moieties, or nearly ſo, was excluſive of the homeſtead and ſtanding meadow. So that a farm of 300 acres, admitted of 150 acres in graſs, lay, or old field, and 150 in crops. Their fields bearing crops were ſeldom equal in quantity: but in the following deſign they are ſo conſidered.

* "In good land the worſe rotation of *fallow—wheat —beans* (or peas or barley) more uſually prevailed." This and the following notes diſtinguiſhed by an S. were written with a pencil, in the margin of one of my ſketches, by an Engliſh country gentleman.

## No. I.

| Acres. | | | |
|---|---|---|---|
| 37 | fallow, *naked*, yields | nothing | — *exhausting** |
| 37 | wheat, | buſhels 555 | — *exhausting* |
| 37 | peas or beans | 555 | — ameliorating |
| 37 | barley | 740 | — *exhausting* |
| 150 | in crops, 4 fields | 1850 | buſhels.† |
| 150 | in graſs or lay. | | |
| 300 | acres. | | |

The

* The richneſs of a clean ſoil is in a ſtate of waſte, when expoſed to the exhaling hot ſun. But their fallows are *manured.* The plowings open and clean the ſoil for receiving ſeed and producing the crop deſired; though in leſs perfection than when the fallow is protected by ſhade during its being plowed or horſehoed. *Exhauſting* here means no more than that the fallow, when expoſed naked to the ſun, is robbed by exhalation of a part of the nutrition of plants depoſited in the ſoil, more than if it were ſheltered by plants growing in rows on the fallow: yet naked fallow is ſo far advantageous that it breaks and cleans the ſoil, without which ſeed ſtrewed on the ground would yield no crop. But the ground broken and cleaned whilſt under ſhade, is conſiderably defended from the exhaling ſun and wind; and is alſo meliorated by *perſpiration* from juicy plants, growing in the rows. If what voyagers ſay be true, that ſome dews,

† *See the next page.*

The manure added, ameliorates: yet the ſun ſhining on the naked ſoil, in the hot ſeaſon, is thought to exhale much of the valuable contents of the manure, and of the ground.

The above is of the crops of *one field during four years*; or of the *four fields in one year*. The following is a plan of the whole

particularly in the Perſian Gulf, are ſalt, the farmer may readily apprehend that a part of the riches of his ſoil may alſo be exhaled by the ſun; and he will reſort to *ſhading* crops on his fallow, for defending it againſt waſte. He knows the value of mere *moiſture*, and how ſoon it evaporates when the earth is expoſed to the ſun and wind without ſhelter. Beſides what I have read of this in Harris's Collection of Voyages, a celebrated late traveller into Egypt and Syria, aſſures me it is true; and that he has taſted the ſalt from dew on his lips, in thoſe countries.

† The quantities given, of the crops, are not meant as real or even as eſtimated quantities; but are noted at random, and continued at the ſame rates in ſubſequent courſes, for comparing the grain products of entire farms, as they are differently divided. All contain 300 acres. —The Maryland and Pennſylvania buſhel, like the London meaſure *in uſe*, is ſomewhat larger than the Engliſh ſtatute buſhel—about $\frac{1}{40}$th.

whole farm (homeſtead, meadow, and lay excepted) with the courſes of the crops in thoſe *four fields* during *four years*.*

| Years. | A | B | C | D | Fields. |
|---|---|---|---|---|---|
| 1791 | Fal. | Wh. | Pe. | Ba. | |
| 1792 | W | P | B | F | |
| 1793 | P | B | F | W | |
| 1794 | B | F | W | P | |

The medium produce of theſe fields, in England, is more than is above ſtated. But it is well to ſuppoſe the quantity they produce per acre is as in this and the following ſtatements: nor is it material what the quantity is, when how much the Engliſh ſoil or how much the American gives, is not under conſideration.

*Engliſh*

* *Four years* crops, of four ſeveral articles, interchanged on *four fields*, complete a rotation of four years; which if properly deſigned, will recur as often as you pleaſe; and on the plan will read, diagonally, the ſame through every Rotation.

*Engliſh New Courſes or Rotations of Crops.*

The better courſes of crops are founded on theſe principles: To *fallow*,* and to have growing on the fallow, whilſt it is yet under the plow or hoe, a *ſhading* and ameliorating or mild crop: never to ſow any ſort of *corn* immediately after corn of any kind: to ſow *clover* or an equivalent on every field of ſmall grain: and with a courſe of well choſen crops and the *ſhaded* fallows, prevent the ſoil from *reſting*, *hardening* and running into weeds.

Thus entire farms are continued in a conſtant rotation under 4 to 6 or 8 diviſions or fields; ſo as with the clean, mellow ſtate of the whole arable, to give a pleaſing ſyſtem of buſineſs, improve the ſoil and procure a conſiderably larger income.

Plowing

* The intention in fallowing is to plow up and pulveriſe the ground; ſhift its ſurfaces; deſtroy weeds and bring up or cover ſeeds to be ſprouted and deſtroyed. "*Hills* ſhould be plowed *obliquely* to the right hand, from the top, down. By which the furrow *turns readily*: as it alſo does when the plow returns *obliquely* up hill, parallel to the former furrow made in going down hill."

Plowing the fields *every year*, bids fair to annihilate even *John's-wort* and *garlick*—indeed every growth but of the crops *deſigned*. The rotation ſyſtem, waring againſt *weeds*, and all coaleſcence or *ſettling and binding of the ground*, will not allow the land to *reſt*. It urges you on to perpetual culture: but *reſt*, being a friend to *weeds* and a *hardneſs* of the ground, cannot belong to *culture*. There is a ſtrong expreſſion among huſbandmen, of "land *untilling* itſelf." They apply it to ground which has been cultivated, and afterwards neglected; ſo that it *reſts*, *ſettles*, and returns to its wonted hardneſs.

No. II.

| | | | | |
|---|---|---|---|---|
| 60 acr. | barley | buſhels | 1200 | — exhauſting |
| 60 | clover | . | . | — *ameliorating* |
| 60 | wheat | . | 900 | — exhauſting |
| 60 | clover* | . | . | — *ameliorating* |
| 60 | peas or beans | . | 900 | — *ameliorating* |
| 300 acr. | in 5 fields. | | 3000 | buſhels. |

In

* "I believe it is never practiſed to ſow clover twice "in *five years*. The ground would ſoon be exhauſted of

In their ſandy light lands, *turnips* in a well prepared ſoil are a common fallow crop,

" the pabulum of clover, and the ſeed would not vege-
" tate. The rotation of clover, ſown once in *four years*,
" cannot be *long* continued without occaſionally *changing*
" the clover for ſome other graſs, uſually hop-clover or
" trefoil mixed with rye-graſs. Without ſuch change
" the ground becomes ſick of clover, and the clover will
" no longer thrive.—The beſt rotation on *ſtrong* land that
" will not bear treading with ſheep, is *barley—clover—*
" *wheat—beans:* or barley, beans, wheat, clover two
" years. In *light* land, the beſt and almoſt univerſal
" rotation is *barley—clover—wheat—turnips.*" S. The above is ſaid of clover *in England.* And it alſo is *there* ſaid of their clover, that it fails much more than formerly; for that it comes up very thick and fine, but " *dies*
" *away* in winter." 2 E. Tour 128. And again, the ſame book, p. 165.—" Land is tired of clover. It
" comes up thick and fine, but is all eaten off in Febru-
" ary, by a red worm; which did not uſe to happen."
——Home's Pr. Agr. 161, ſpeaking of *change of ſpecies*, ſays,—" ſome plants are deſigned to *fix* the ſoil; others,
" to *open* it; the *fibrous* rooted and the *tap* rooted." So far at leaſt, *change of ſpecies* is adviſable, and ſowing *corns*, which have *fibrous* roots, and *legumies* or *clover*, which have *tap-roots*, alternately, tend to effect this ameliorating purpoſe, and preſerve a due medium between too cloſe and too open a ſoil. Though change of *ſpecies* may be neceſſary, I do not believe that change of *ſeed* of the ſame kind, at leaſt of wheat or other common corns is. I never could perceive any difference. Many

crop, inſtead of peas or beans; the turnips being thinned greatly, and frequently hand-hoed, or if in rows, horſe-hoed, ſo as to keep the ground clean and well ſtirred; and they are always on manured ground.*

A

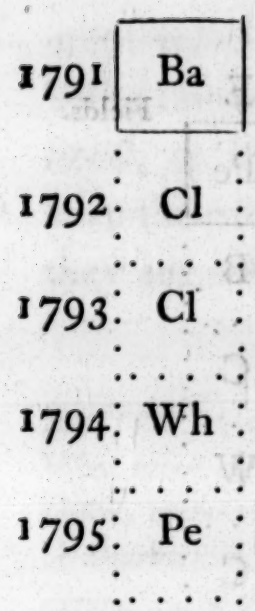
ideal old ſayings paſs current without examination. What more current than that acid of vitriol is a poiſon to ſoil, or to vegetation? yet Doctor *Home* proved it to be a powerful manure; and plaſter of Paris is but a calcarious earth ſaturated with acid of vitriol. So it is ſaid of animals, that it is neceſſary to *croſs the ſtrain*. To be ſure a horſe of ſuperior breed, may be expected to give a better colt to your preſent inferior breed. Mr. *Bakewell* ſays, propagate from your own horſes till you meet with better. Certain ſeeds of *exotic-plants*, may be changed to advantage: yet the *corns*, common to all the world, it ſeems, require not a change of ſeed. But it is ſaid that, "in *Egypt*, the French are obliged "to import, annually, the ſeeds of cauliflowers, beats, "carrots, and ſalſify; and apricots, pears, and peaches, "tranſported to *Roſetta*, degenerate." Vol. Syr.——And ſo it is in America, reſpecting *cauliflower* ſeeds.

* Our American farmers are 10 to 15 degrees ſouth of the farms in England; yet ſo keen are our froſts and ſo ſudden and frequent the changes from thaw to froſt, that common turnips do not ſtand the winter through, in our fields. The new turnip, called *roota baga*, is likely to ſtand our winters; for ſupplying cattle and ſheep with a juicy food in winter and ſpring,—a

| 5 Years. | A | B | C | D | E | Fields. |
|---|---|---|---|---|---|---|
| 1791 | Ba | Cl | Wh | Cl | Pe | |
| 1792 | C | W | C | P | B | |
| 1793 | W | C | P | B | C | |
| 1794 | C | P | B | C | W | |
| 1795 | P | B | C | W | C | |

1791

ſauce to their dry food, for keeping them open againſt the coſtive effects of ſtraw. I have but once had an opportunity of ſowing its ſeeds: the roots from which ſtood through the winter perfectly ſound, in the ground. But it was the mild winter 1795-6.——The common courſe of crops in England, of *turnips*, *barley*, *clover*, *wheat*, a change of only four fields, on their light lands, after twenty years experience, is thought by ſome farmers, to ſurfeit the ground, by the frequency of the repetition or recurrence of the ſame crops, ☞ *when they are without manurings:* the ſame crops returning in the ſhort ſpace of every *four years*. Mr. *Pitt*, an excellent farmer in England, who mentions this to Mr. Young, thinks it is very bad tillage, eſpecially *on weak ſoils*, unleſs the land is marled or twice ☞ *manured* in the rotation. He adds, that on breaking up the turf, ſome have with ſucceſs, taken *ſpring corn*, followed immediately, after work-




Here the *crops* are the ſame as the preceding—but the *courſe* is different. In that the clover is annual: in this it continues two years. When clover is continued two or more years, it lets in weeds and ſome binding of the ground, to a degree that may have occaſioned the ſaying, in England, of the ground becoming, in that country, "clover ſick." But *yearly* renewing the clover.

ing the land well, with *wheat, turnips, barley* with graſs ſeeds, and *manuring upon the ſeeds and for the turnips;* which courſe, he adds, proves good, and the crops heavy. The ſuperiority of crops in this courſe, he thinks, is cauſed by *manuring* on the ſeeds, and by *a fifth* of the land *laying five years in graſs.* 4 An. 478. This ſuggeſts the propriety of having, in every rotation of crops, one field extraordinary to lay in graſs, not clover, till the courſe ends: that is, whilſt the four to five or ſix fields are revolving in crops, one other field is to be laid down and continued in graſs, or rather ſtanding meadow. For inſtance: *wheat, clover, rye, clover, beans* or roots, interchange whilſt the graſs-field continues unbroken, during the five years crops of grain and clover. Then this is broke up, and put into a courſe of crops, as the others; and one of the crop-fields is laid down in graſs.

ver in the rotation of crops, neither admits of *weeds* or a *binding* of the ground. The clover in this caſe, being ſufficiently thick and well ſown, effectually ſhades and mellows the ſoil, without having time allowed it or the ſoil to decline.*



* The climate and the ſoil of America may be believed to differ greatly from thoſe of England, reſpecting the growth and perfection of ſome particular plants. Wheat ſown there 2 to 3 buſhels an acre, yields great crops of corn. Two buſhels an acre ſown in Maryland or Pennſylvania, would yield ſtraw without grain. In Maryland three pecks are commonly ſown. I never had better crops than from half a buſhel of ſeed wheat to an acre, in a few inſtances. In theſe inſtances, the ground was perfectly clean and fine, after many plowings or horſehoings of maize; on which the wheat was ſown in September, whilſt the maize was ripening. It was a clay-loam, highly pulverized. But becauſe of the loſs of plants at other times, I preferred to ſow three pecks an acre.—The attentive Mr. E. an excellent farmer of Pennſylvania, made a farming tour in England; and obſerved that clover there is very inferior to what it is in Pennſylvania. This may be owing, partly, to the climate and ſoil being leſs friendly to this plant than in America: and certainly it is againſt clover to continue it growing for years, ſo that weeds and fibrous rooted graſſes are let in to rob the clover and bind the ſoil. It is even an Engliſh practice to ſow rye graſs with clover: and rye graſs is a very fibrous

*Compariſon between the Engliſh Old and New Courſes of Crops.*

Upon comparing the old with the new courſes in England, it occurs that the 120 acres in clover, may be conſiderably ſuperior to the 150 acres of common graſſes on the hide-bound ſoil of the lay or old field; and that the grain and ſtraw is ſuperior as 300 to 185. Peas and beans are inoffenſive,* as is clover, and even are ameliorating. They all *ſhade* the ground during the hotteſt time of the year. All corns impoveriſh; and withal, the *ſmall* kinds let in *weeds*; which with *reſt*, bind and foul the ſoil. But they

rooted binding plant. The ground becoming "clover-ſick" is unknown in America,—unleſs its being reduced by a long continuance of the clover and introduction of weeds and graſſes, will admit of the expreſſion. But clover-ſick in the ſenſe ſpoken of in the note page 29, is unknown and unſuſpected in Americ[illegible]. Red clover is only meant.

* "Not unleſs they are kept clean from weeds by ho-"ing, which cannot be performed, unleſs they are ſown "in drills." S.

they check the waſhing away of ſoil; which maize culture greatly promotes, by repeated plowings or ſcratchings given whilſt the maize is growing.

No. I. has two fields ſtirred and cleaned: the fallow, a naked one; and the pea or bean field when in rows. The growing crop of the laſt ſhelters the ſoil from extreme exhalation; and is the only ameliorating crop againſt the two exhauſting crops, wheat and barley. No. II. has one horſehoed or plowed field, in a fallow crop of peas or beans; and three fields of ameliorating productions, which are peas, clover, clover (that is continued two years) againſt the two exhauſters, wheat and barley. The field-bean in England, though ſmall, is of the nature of the garden or Windſor-bean. It grows upright, and giving but a partial ſhade, is not fully an ameliorating crop, unleſs well horſehoed in the intervals, between the rows.* Neither are turnips or



* "Beans are uſually drilled in rows 18 or 20 inches "aſunder, in England, and kept clean by handhoing,

potatoes good fallow crops unleſs they are manured and cultivated in the like manner. They there are always on manured ground. Engliſh peas ſoon covering the ground, even when ſowed broad-caſt, are good fallow crops, although not horſehoed.

### *American Old Courſes of Crops.*

When in Maryland ,a farm is divided into three fields, the common courſe is maize, wheat or rye, and ſpontaneous rubbiſh paſture. When in four fields, it is maize, naked fallow, wheat, and the like mean paſture: or maize, wheat, lay or poor paſture during two years. And whilſt in ſome parts of America, the fields are four or five, in other parts the diviſions are as low as

" in Yorkſhire, the diſtance not admitting of a horſehoe; " nor did I ever hear of one being uſed, except perhaps " in ſome part of Kent, where beans grow with an un- " uſual luxuriance, and are conſequently ſown at an un- " uſual diſtance." S.—In Maryland I ſhimmed (a kind of horſehoing) peas, beans and potatoes, growing in rows 18 or 20 inches apart, equal to two of my plow furrows.

as two. Two exhauſting corn crops repeatedly taken from three or four fields, after ſome years of ſuch crops, would ſcarcely admit of eight buſhels of wheat an acre being produced on common land, one year with another:* but, ſuppoſe

No. III.

| | | | |
|---|---|---|---|
| 100 acr. | maize, at 12 buſhels | | 1200 |
| 100 | wheat, | 8 | 800 |
| 100 | lay, or mean paſture | | |
| 300 acres in 3 fields | | | 2000 buſhels. |

No. IV.

| | |
|---|---|
| 75 acr. | maize |
| 75 | wheat |
| 75 | lay |
| 75 | lay |

300 acres, in 4 fields.

No.

* A few years ſince, it was a general belief that ſix buſhels of wheat an acre, was the medium produce of a large extent of country within the peninſula of Cheſapeak: but ſince then, till the Heſſian fly took poſſeſſion of the wheat growing there, the wheat culture was improved ſo as to gain a larger produce, in that diſtrict. I cannot ſo well judge of the crops in Pennſylvania; but believe they exceed twelve buſhels of wheat on an acre;

No. III and IV. give light crops, moſtly of a cheap corn, very poor paſture, and but little hay (if any) for keeping a ſtock of hide-bound beaſts and preſervation of a ſoil which is in an obvious conſumption. Under ſuch ſevere treatment, land is continually loſing ſtrength; and it may be, greater productions are here allowed than the old ſettled maize farms yield, and than new ones can long continue to yield, under the old habits of farming, if it may be called farming.*

We

and that they are progreſſing with the increaſing ſtate of clover and manurings with dung, gypſum and lime.

* What is above ſaid, applies rather to Maryland than to farming in Pennſylvania; where watered or irrigated meadows have long been in common uſe: and it is remarkable that the irrigated and bottom meadow lands are now thought lightly of, in compariſon with the very high eſtimation they were in before clover came into field culture. Still irrigated grounds are, as they ever will be, very valuable: but ſo ſure and plentiful are clover crops, that the Pennſylvania farmers are leſs ſolicitous about meadows. Till lately a farm without irrigated or bottom meadow, was never much valued. Now, purchaſers are leſs anxious for thoſe articles, as they are ſure of abounding in clover and hay from the arable upland.

We almoſt univerſally cultivate one field in maize, whatever may be in the other fields. The maize being frequently plowed or horſehoed,* the ground is thereby kept *light* and *clean;* and it gives a fallow with a crop: but it is an ill choſen crop for a fallow, becauſe of its giving only a trifle of *ſhade* to the freſh expoſed ſoil, and becauſe it is *corn*, to be ſucceeded commonly by other *corn:* and all corns are terrible exhauſters. Some farmers ſow wheat on this maize-field, in September before the maize is ripe, on a clean, light ſoil. Others delay ſowing it till the enſuing autumn, when the ſoil being ſomewhat ſettled and much in weeds, they plow, harrow, and ſow it with wheat. Of the two methods farmers differ in the choice. I have known ſome who had practiſed in both methods, return to

* Horſehoing, is ſtirring and cleaning from weeds the interval ground, with a plow or any inſtrument which cuts, divides and breaks it by the power of horſes, at the ſame time that a crop is growing in rows between the parts horſehoed. Whilſt our maize is growing, we repeatedly horſehoe it; and we call it, "plowing the corn."

to the former; becauſe the latter was, as they judged, more injurious to the ſoil than the former method.

### *American Fallow-Crops; and New Rotations, with and without Maize.**

Maize taken into a rotation under the new ſyſtem, according to the newly adopted principles of huſbandry, occaſions ſome difficulty, which ſeems beſt overcome by increaſing the number of fields. Our huſbandmen are ſo uſed to maize crops, that ſcarcely any appear diſpoſed to give up the culture of this corn, for productions much milder in their effect on land. Nor is it adviſable that they ſhould relinquiſh it, unleſs it may be on thin ſoil very liable to be

* Theſe methods are rather propoſed than as yet practiſed in America. But, a beginning is made. Mr. M'Donough of Delaware has practiſed rotations on the new principles, with the moſt pleaſing ſucceſs: and Mr. Pearce, of Maryland, in leaſing out his fine eſtate in Saſſafras Neck, reſerved 120 acres, which he cultivates in ſix fields, and gives his neighbours an inviting example of the ſuperiority of the new, over the old modes.

be waſhed away, and the land apt to be broken into gutters. Maize is the beſt of all the corns. It is food for moſt animals, and its plant yields a great increaſe of grain. Seaſons or plagues which injure other corns do not affect maize: the growing it therefore gives many chances againſt want. As a food to man it is remarkably wholeſome and nouriſhing, and admits of the greateſt variety in its preparations. In cultivating it the ſoil is cleaned and lightened, preparative to other crops: though it is inferior to preparations with ameliorating crops giving more ſhade, and moiſture from perſpiration.

## No. V.

### A MAIZE COURSE.

| | | |
|---|---|---|
| 50 acr. | maize | 750 |
| 50 | wheat or ſpring barley | 750 |
| 50 | clover | |
| 50 | rye or winter barley | 900 |
| 50 | clover | |
| 50 | clover, pulſe, or roots | |
| 300 acres | in 6 fields | 2400 buſhels. |

It

It is a fault in this ſyſtem that wheat ſucceeds maize, that is corn ſucceeds corn. Rye or barley might have been in the place of wheat, but theſe alſo are corns, which exhauſt the ſoil. Clover after maize which has not been manured is not likely to ſucceed, eſpecially when ſown without a *ſheltering* crop; and this ſheltering crop being from any grain, would introduce the miſchief incident to corn on corn. But even this faulty ſyſtem is far preferable to any of our old courſes.* Had there been only five fields, it would have been worſe for the ſoil; becauſe a courſe of only two fields in ame-

* On the above maize courſe No. V. Mr. S. obſerves that—" unleſs there is ſomething in the ſoil and climate " of America, far more favourable to clover than in " thoſe of England, this rotation could not be repeated, " for reaſons before given. It probably is not ſuffi- " ciently aſcertained how frequently clover can be ſown " in America." S.———*Buckwheat* is an excellent *ſheltering crop to clover*, ſown in *July*. If maize has been *manured*, a crop of buckwheat, from a ſowing in July, may be taken off in October, after it has ſheltered *clover* ſown alſo in July on the buckwheat being ſown. See the note page American beans are meant in American crops.

ameliorating crops to three in exhausting corn, must in time render the ground weak, and comparatively unproductive.

## BETTER MAIZE COURSES.

### No. VI.

| | | |
|---|---|---|
| 50 acr. | maize | 750 |
| 50 | pulse (or roots) | 500 |
| 50 | barley | 1000 |
| 50 | clover | |
| 50 | wheat | 750 |
| 50 | clover | |
| 300 acres, in 6 fields | | 3000 bushels. |

### No. VII.

| | | |
|---|---|---|
| 43 acr. | maize | 645 |
| 43 | pulse or roots | 430 |
| 43 | barley | 860 |
| 43 | clover | |
| 43 | wheat | 645 |
| 43 | clover | |
| 43 | clover (a second year) | |
| 300 acres in 7 fields | | 2580 bushels. |

Here

Here the corn crops are interpoſed by clover and pulſe: both of them ameliorating to ſoil; eſpecially when the pulſe grows in rows ſo near as to *ſhade* the well plowed and cleaned intervals; and theſe crops are of three or four ameliorators, to three exhauſters.*

## BEAN-COURSES.

Farmers having waſhy ſoils, who would exclude maize from their crops, may adopt No. II. in five fields; or one of the following in 6 or 7 fields; obſerving that the beans muſt be the American ſorts.

### No. VIII.

| | | | |
|---|---|---|---|
| 50 acr. | beans and roots | . | 500 |
| 50 | barley . . | | 1000 |
| 50 | clover . . | | . |
| 50 | wheat . . | | . 750 |
| 50 | clover . . | | . |
| 50 | rye . . | | . 750 |
| 300 acres, | in 6 fields | . | 3000 buſhels. |

No.

* Wheat, barley, rye, maize, oats, and generally all ſorts of grain of which *bread* is made, are *corns*.

## No. IX.†

| | | |
|---|---|---|
| 43 acr. | beans and roots . | 430 |
| 43 | barley . . | 860 |
| 43 | clover . . . | . |
| 43 | wheat . . | 645 |
| 43 | clover . . . | . |
| 43 | rye . . | 645 |
| 43 | clover . . . | . |
| 300 acres, in 7 fields . | | 2580 buſhels. |

Beans or peas, following clover, are drilled on *one* deep plowing in June. Barley is ſown in September or October, on *one* plowing; the ground having been left clean and mellow after inning the beans. Wheat is ſown in September on *one* plowing in of the clover. What a ſaving of work!—Three crops on only one plowing for each, and performed at leiſure! on ground in the melloweſt condition. The beans

† "For reaſons before given this muſt be the worſt "rotation yet pointed out; the clover being ſown three "times in ſeven years." S—This in England. But, in America, clover is free from the diſorders imputed to it there.

beans are plowed for in *June;* the wheat in *September;* the barley in *October*, or September: or on ſome crops in *March.* One of them, a cleaning crop, is horſehoed or ſhimmed without any interference with the plowings and other work in ſowing the wheat or barley. The clover which is to be plowed in for beans, may be paſtured till June, if not mowed for hay: this would be eſpecially advantageous on farms deficient in *meadow;* as there will then be two clover fields for graſs and hay; and moreover the ground of that *mown*, will be preſerved in a light and mellow ſtate, for receiving the bean ſeed on the one plowing.

The following are plans of all the fields in No. VI. a *maize ſyſtem*, and No. VIII. a *bean ſyſtem;* ſhewing the whole of their crops during ſix years.

No.

## No. VI.

| 6 Years. | A | B | C | D | E | F | 6 Fields. |
|---|---|---|---|---|---|---|---|
| 1791 | Ma | Be | Ba | Cl | Wh | Cl | |
| 1792 | Be | Ba | C | W | C | M | |
| 1793 | Ba | C | W | C | M | Be | |
| 1794 | C | W | C | M | Be | Ba | |
| 1795 | W | C | M | Be | Ba | C | |
| 1796 | C | M | Be | Ba | C | W | |

## No. VIII.

| 6 Years. | A | B | C | D | E | F | 6 Fields. |
|---|---|---|---|---|---|---|---|
| 1791 | Be | Ba | Cl | Wh | Cl | Rye | |
| 1792 | Ba | C | W | C | R | Be | |
| 1793 | C | W | C | R | Be | Ba | |
| 1794 | W | C | R | Be | Ba | C | |
| 1795 | C | R | Be | Ba | C | W | |
| 1796 | R | Be | Ba | C | W | C | |

Three

Three valuable crops produced on only one plowing for each, is very important: and they are on ground in the melloweſt condition. Other valuable crops may be procured from ground not even once plowed *for them*. Every American farmer has his maize field; which is or ought to be highly plowed or horſehoed, and if not ſown with the *exhauſters* wheat or rye, it is ſuffered to run up in *weeds*.

Inſtead of ſowing wheat or rye on the maize ground, or leaving it naked, why not profit of the maize plowings and cultivation, in obtaining milder crops on the ſame ground; which require no other cultivation than what are neceſſarily applied to the maize, unleſs it be to ſtrew manure along the rows of roots, below mentioned? Wheat and rye are ſown in other fields, on clover.

If the maize is 4 feet apart in the rows; and the interval ground between the rows 7 feet, the cluſters or hills of maize are

1550

1550, ſay 1500 on an acre. Between the cluſters of maize, in the rows, may grow cabbages, carrots, or potatoes. One cabbage in that ſpace; or two holes of potatoes, a foot apart; or five carrots, five inches apart. Along the middle of the *intervals*, turnips 10 or 12 inches apart, the ſeeds ſown the *laſt of July*: or roota baga; the ſame diſtance, ſown *in May or June*. Plows or ſhims are to be worked lengthways of the intervals, in a ſpace of $3\frac{1}{2}$ feet on each ſide of the rows of turnips, whilſt the maize and other plants are growing. Near the end of September or firſt of October, with ſharpened hoes, cut up the maize ſtalks cloſe to the ground; having firſt ſtripped the blades, or not, as you like, but always with the ears on: and pile the ſtalks in pyramidal form, in ſmall parcels, on the turnings or head-lands, to cure. What of the roots cannot be ſaved in cellars and holes, may be covered with earth by plowing.

The greateſt quantity of *grain* produced in a rotation is not alone a proof of its be-

ing the beſt ſyſtem. A large quantity of good meadow would yield much hay. It is a ſin againſt good huſbandry to ſell off the hay of a farm. Numbers of cattle well fed and well littered, give the manure, in addition to other manures, requiſite for invigorating the ſoil: but numbers of cattle cannot be kept in good condition *through the year*, unleſs clover or graſs as well as hay abound. The ſummer food and that of the winter are to bear a due proportion to each other: and the fields of grain are not to exceed the fields of *ameliorating* crops. Theſe preſerve the ſoil, as well as produce crops: but *grain reduces* the ſoil in producing the crops.

It is reaſonable to expect that the better courſes No. VI. VII. VIII. and IX. would yield by the acre, more of every article of produce than the inferior courſe No. V. But they are ſtated alike. Of the ſeveral ſorts of white beans, I have only cultivated the white dwarf or buſh bean, in my fields, which was in rows 18 inches apart, and cleaned

cleaned with a ſhim, the blade whereof was a little convex in the line of its front or edge, which was 12 inches wide. The ground perfectly clear of ſtone and gravel. Theſe beans conſiderably ſhaded the ground, though not ſo fully as was wiſhed. It was therefore intended to have tried the ſort of white beans which would run and *ſhelter* the ground more perfectly, after being horſehoed with a ſhim* repeatedly, as long



* *Shims* are in various forms, acute or obtuſe, as the ground is ſtony or not. In general, it is a hoe drawn by a horſe. The blade of the one I uſed, was 12 inches wide, and was welded to a ſmall coulter on each ſide of it, ſerving alſo as ſtandards to the blade. Two ſtilts are faſtened to the coulters with ſcrews and nuts, which could be ſhifted to different holes for ſetting the ſhim to go deeper or ſhallower in the ground: but they were little uſed. The ſhim is not uſed in half plowed ground: but this being previouſly well plowed and harrowed, the ſhim runs 3 or 4 inches deep, and crumbles the earth into ſuch minute parts that, as it proceeds, the earth ſeems to pour over the blade of the ſhim like water. A coarſe rake of 4 or 5 teeth, hung to the tail of the ſhim, as it worked. The two coulters or ſide ſtandards ſeemed to interfere with the growing vines, when they were advanced to a conſiderable ſize: but there appeared no real damage from it. A ſingle ſtandard of wood or iron would be

as that inſtrument could be admitted to paſs between the rows to advantage. Removing to reſide in Philadelphia, prevented the making this experiment. It is ſaid that white beans are generally in great demand in Madeira and the ſouthern countries of Europe. I have ſeen letters from Barcelona ſtating the price of "white beans" higher there than of wheat. Other ſorts of American beans as well as ſeveral ſorts of American peas, I have cultivated; and the crops

clear of even full grown vines. I did not always hill or ridge up potatoes and beans, nor even maize. For though maize is the better, yet the ground and future crops are the worſe for it. But it is well to edge up ſome moderate quantity of earth to plants cultivated in rows with the horſehoe or ſhim. The intention whereof is to ſmother infant weeds which have juſt broken out cloſe to the crop, and beyond the reach of the ſhim. Hills and ridges are not otherwiſe ſo advantageous as is commonly thought: and there are advantages in keeping the ground nearly level when under maize. A ſlip of iron is made to ſhift off and on each ſide of the blade of the ſhim, for occaſionally edging up light ridges of earth. The ſhim is an excellent inſtrument againſt young weeds; but is inſufficient where graſs and weeds have obtained ſtrength. When the ground is in good condition, it performs a vaſt deal of work, very ſatisfactorily.

crops of all were rather precarious; peas generally more ſo than beans, excepting the lady pea, which is round and the ſize of duck-ſhot. Until ſome other plant ſhall be introduced which will anſwer better than beans for a fallow crop, farmers ought to think nothing of giving a dollar a buſhel for them to be applied to produce a *ſhading* and ameliorating article of fallow, although not a bean ſhould be gained from them: preſerving the ſyſtem being ſo very important! It is not uncommon for active ſpirited farmers in England, to ſow ſeeds of various plants, merely for improving their ſoil: ſuch as vetches, tares, buckwheat.* Theſe whilſt

* *Vetches* and *Tares* are different names for the ſame pulſe, the varieties are great. Generally, they are divided into winter and ſummer vetches. Conſult Mr. Anderſon's Agriculture. He ſpeaks of ſorts which are perpetual. I would prefer a vetch hardy enough to bear our winters; and that is of quick growth and ripens early, whether it be of the perennial kind or not. With ſuch a plant might be practiſed Mr. *Young's*, "round and complete" mode, preſently mentioned in the text. One ſort of winter vetch, I have tried; the ſeed imported from England. The ſeeds were ſown in two ſucceſſive autumns. The ground being rather of the ſort called

whilſt growing, *ſhelter* their fallows; and being plowed in green, they ferment and open the ſoil. Such alſo is the effect from clover; which having wheat ſown on it, upon *one* plowing, is followed with extraordinary crops. Mr. *Young* mentions an excellent courſe of ſhade and green dreſſing, preparative to a corn crop; by which ſeeds for producing three crops were ſown on the ſame ground, between autumn and autumn, with only three plowings, thus: winter *tares* were ſown in September with one plowing. They were reaped early next ſummer. Then immediately *buck-wheat* was ſown on one plowing and harrowing. The buckwheat was plowed in, in September;* and wheat was ſown on this,

"water holding," and only about a moiety of the plants ſtood through the winters.

* *Buckwheat* is to be plowed in before it ſeeds, leſt a new growth becomes a weed to the crop of corn. The partridge pea, Aquamaque or Magothy bay-bean, has wonders imputed to it as an ameliorater of the light *ſandy lands* in the peninſula of Virginia. In ſize and other particulars, the plant may be conſidered as being a Lilliputian locuſt tree. For, although it is an annual, yet its

this, on one plowing; the crop whereof was great. "Thus, ſays Mr. Young, as "the ſpring advances, and the ſun becomes "powerful enough to exhale the humidity "and with it the nutritious particles of the "land, the crop (which was from a full "ſowing) advances and ſcreens it from the "action of his beams. Whatever weeds "are in the ſoil vegetate with the young "tares, and are either ſtrangled by their lux-

"uriance,

ſtem is a hard locuſt-like wood; and its leaves, flowers, pods and ſeeds greatly reſemble thoſe of that tree. The woody hardneſs of the plant is in appearance againſt its being a choice ameliorater, as it is not likely to ferment and as it were melt away in the ground, ſo ſoon as buck-wheat and other juicy ſoft ſubſtances. No plant, however, can exceed the *ſhade* it gave on a piece of ground in my garden. A Lilliputian might have been there loſt in darkneſs. This *ſhade* and a *perſpiration* from the plants, during the greateſt heat of ſummer, together with an extraordinary quantity of *bloſſoms*, *pods* and *leaves*, which the plants depoſit on the ground are probably what give the great manuring and amelioration, which the people of Aquamaque ſatisfactorily experience. But this plant is ſo difficult to eradicate, it is ſaid that it is ſuſpected it might become an injurious weed in *other ſoils* and *courſes of crops*, than thoſe in Aquamaque. Their courſes being maize, oats and lay, on a ſandy looſe ſoil, good of the ſort.

" uriance, or cut off with them before " they can ſeed. This crop is cleared from " the land ſo early that the ſoil would re- " main expoſed to the ſun through the moſt " burning part of the ſummer for three " months; and if ſo left expoſed, the three " plowings would do miſchief, except in " killing ſome weeds. To give one plow- " ing *immediately* and harrow in buck- " wheat, ſpares expenſe, and the growing " herbage ſhades the earth when it wants " moſt to be ſo protected: withal a dreſ- " ſing of manure is gained at no expenſe. " It is not in the power of ſcience, of the- " ory or of practice to introduce a ſyſtem " more *round and complete*. Many have " ſown tares; and many have plowed in " buckwheat; and moſt have given a year " to each; but it is the *combination* of the " two that forms the merit."

*A Parti-*

*A Particular Deſign for a Grain Farm.**

Timothy graſs, when cut not before milk is in the ſeeds, makes a browniſh and ſeemingly harſh hay: but horſes, the beſt of judges, prefer it to early cut green hay. On ſome accounts orchard graſs may be preferred for permanent *meadows*. It comes early in the ſpring, laſts till winter, is hardy and gives large crops. The ſeeds of it ſhatter out before the heads are generally changed from the green colour. Watch the moment for ſaving ſeeds of it.

Keep 20 acres of permanent *meadow* in timothy or orchard graſs, for hay. This laſt comes early in the ſpring, with clover. They may be cut immediately one after the other, or at the ſame time; and the hay ſtowed away together, layer on layer which may be a means of correcting ſome ſuppoſed

* Written for the late Mr. *Rigal*; when he thought of ſitting down on a grain farm, at a conſiderable diſtance from town.

ed bad qualities in clover: at leaſt thoſe dry hays would abſorb any redundant moiſture remaining in the clover hay. Beſides you can ſtack your clover hay out of doors more ſecurely, when you have a good quantity of timothy or orchard graſs meadow, for furniſhing the clover ſtacks with good toppings from its hay; if you are not in the practice of thatching with ſtraw.

General Diviſion.

| | |
|---|---|
| Homeſtead | 10 acres |
| Meadow | 20 |
| Crops | 120 |
| | 150 |

| Acres. | | Acres. | |
|---|---|---|---|
| 20 | Pulſe and roots, fallow crop. | 17 | Maize, fallow crop. |
| | | 17 | Pulſe and roots, do.* |
| 20 | Barley. | 17 | Barley or rye. |
| 20 | Clover. | 17 | Clover. |
| 20 | Wheat. | 17 | Wheat. (May be ſown in July with Bw. & Clover, if the ſoil is rich.) |
| 20 | Clover. | | |
| 20 | Rye. | 17 | Clover. |
| | | 17 | Roots, or cl. 2d year. |
| 120 | acres in 6 fields. | 120 | acres in 7 fields. |

The

* Inſtead of pulſe or roots, here, there may be a manuring given by a ſpring ſowing of *buckwheat turned in,*

The maize courſe requires one of the fields to be continued in clover, two years; unleſs it be tended in roots, buckwheat, &c. upon turning in the firſt year's clover, after the ſpring mowing. Potatoes are beſt when planted in June; by which their bulbing ſtate avoids the too dry ſeaſon of midſummer. I doubt however of the buckwheat *crop;* as it is ſaid to be rather impoveriſhing when it ſeeds. Roots are excellent on ſeveral accounts: they are but little injurious to the ſoil; and when duly cultivated they are even ameliorating. They are peculiarly

and then *buckwheat* ſown in July for a *crop* with *clover* ſeed on it: which would alſo give a ſyſtem in manured *maize* thus: *maize; buckwheat*, preceded by a manuring of plants turned in green; *clover; wheat; clover; barley* or rye and roots; *clover*, in 7 fields: a great variety and change of ſpecies eaſily manured every 7 years! and according to the note in page 32, there may be a portion allowed to lay, in *meadow*, during the rotation of crops. If the *maize ground* has been well *manured*, on the laſt plowing in July, *buckwheat* may be ſowed for *crop*, and immediately on it, clover ſeed; the ground being kept level *without any hill or ridge* to the maize plants. Or if a field is meant to be turned out, to lay in meadow during a rotation of crops, then inſtead of clover, ſow timothy or orchard graſs with the July ſowing of buckwheat.

culiarly deſirable as a winter and ſpring food to live ſtock, for their nouriſhing quality, and to correct the coſtive tendency of their dry food. If you cannot think ſo highly of roots as I do, you may prefer ſix twenty acre fields, in maize, pulſe, barley or rye, clover, wheat, clover one year. In ſome of the ſtates there is a ruinous bias for *large fields* of grain, eſpecially wheat and maize; and this eſpecially in young giddy farmers, wild after expenſive amuſements, and waſteful of *time* and income which ought to be applied to *domeſtic comforts*. A great deal of ground is ſcratched and hurried over, with the deluſive expectation of much wheat and maize, for extricating them from debt, or to ſupport their habits of frivolous enjoyments *abroad*, inſtead of improving their farms and promoting happineſs *at home*. But, how miſerable are the crops!—how impoveriſhed the ſoil!—and how entangled the improvident farmer!*

A bean

* Farmers differ in the opinion whether buckwheat is an impoveriſher or not of ſoil. Some ſay it impoveriſhes

A bean fallow crop is where beans are ſown in *rows*, about 10 inches apart; and the

when ſuffered to run to ſeed: but all, who have tried it, admit that it improves ſoil when plowed in before it forms ſeeds. My experience of it is ſlight. Few farmers ſouth of Pennſylvania, know the value of buckwheat: for, being ignorant of its properties, they hold it in no eſtimation, and avoid it. In England a Mr. Farrers and Mr. Young have given their opinion of it as follows; and in Pennſylvania there are few farmers who do not find their account in it; for all ſow it for crop, and ſome to turn in for a manure to the ſoil. Mr. *Farrers*, a conſiderable corn factor, deſires that all who have horſes to feed, will try buckwheat *mixed with bran, chaff, or grains*, either whole or broken in a mill. When uſed as graſs it fluſhes cows with milk: it is therefore preſumed the meal mixed with grains, would have the ſame good effect, and enrich the milk. A buſhel of it, he adds, goes further than two buſhels of *oats;* even with beans mixed with four times as much bran it will be full food for a horſe a week, and much leſs hay will do. Be aſſured, he ſays, 8 buſhels of *buck-wheat meal* will go as far as 12 buſhels of barley meal; and he writes this from experience, and he concludes with obſerving that the advantages produced from ſowing buckwheat are as follows:

1ſt. To *plow it in*, which mends the land:

2d. In a dry ſummer, it is fodder (graſs) for the cattle:

3d. If it ſtands for a *crop*, it may be equal in *quantity* with oats.

the *intervals*, between row and row are 18 or 20 inches apart, and horſehoed or ſhimmed repeatedly; whereby the ground is kept ſtirred and clean, ſo as to be a well prepared fallow for receiving another crop. So it is of a maize fallow crop.

If

On what Mr. Farrer ſays, Mr. *Young* obſerves that the application of *buckwheat as a food to horſes*, has been very properly touched on by Mr. Farrer; and that it is of very great importance. On my own repeated experience, ſays Mr. Young, this plant *ameliorates the ſoil* ſo much that the farmer may have *any crop* after it, eſpecially *wheat*; and ſo it is commonly cultivated about Norwich. 1 An. 199. Yet farmers in America ſay it is an improper food for horſes on a journey or any active buſineſs: but its meal mixed with other corn, or perhaps cut ſtraw, anſwers well even for horſes, in a ſlow draught. But certainly it is a *cheap corn*, which anſwers *many good purpoſes*. I never have ſeen ground tolerably prepared for a buckwheat crop. In common it is ſown upon a ſingle ſlovenly plowing of oat or other ſtubble; and the ſeed is hurried in, as oats too commonly are, on ground we know not how elſe to employ. If clover or timothy ſeeds are to be ſown during the hot weather of the ſummer, buckwheat plants give the moſt excellent ſhelter, till in October the buckwheat is cut for its crop: after which the ſun can no longer injure the clover; but gives it a due portion of warmth, and puſhes it forward till cold of winter locks up all vegetation.

If one field is manured in each year, then the ſix fields will be all manured in ſix years, at 20 acres a year: and ſeven fields in ſeven years at 17 acres a year. The farmer who manures the whole of his arable fields in every ſeven years, will accompliſh a great object, tending highly to his domeſtic comfort, his reputation, and his independency of creditors! The ſtanding meadow muſt have its full ſhare of manure.

Manuring one field every year, is to be an unceaſing practice, in a regular rotation for ever. Manures are to be ſaved in compact maſſes, ſheltered from the ſun; and in ſome meaſure from the rain, though what of it falls on the area of the dungheap can ſcarcely injure the dung, ſome moiſture being requiſite to its fermenting. It is adviſable to make ſmall trials of your ſoil, with lime, gypſum, clay, trench plowing, &c. on ſlips of your land: for no one can ſay beforehand, what will be the effect of theſe applied to your particular ſoil.

Every

Every kind of manure is to be carefully collected and duly ſheltered. On manure being carried to the field, ſpread and plow it in quick as poſſible. Have the implements and the labourers ready on the ſpot. Range the loads in *lengths;* ſpread and inſtantly plow the dung in, line by line. It diſſolves better in the ground when turned in freſh; and the whole ſtrength of it is ſecured to the ſoil.

For the ſake of manure, and on account of the cattle; keep all live ſtock *houſed;* fully littered; duly *fed,* including a ſhare of *juicy* food added to their *ſtraw.** A leſs quantity

* I farmed in a country where habits are againſt a due attention to *manures*: but having read of the application of *marl,* as a manure, I inquired where there was any in the peninſula of Cheſapeak, in vain. My own farm had a greyiſh clay which to the eye was marl: but becauſe it did not efferveſce with acids, it was given up; when it ought to have been tried on the land; eſpecially as it rapidly crumbled and fell to mud, in water, with ſome appearance of efferveſcence. Elſewhere I ſpeak of common *yellowiſh clay,* turned up to two feet at one place, and three or four feet deep at another, proving very productive of mellon vines. Mr. *Young* ſpeaks of *clays* (4 E.

quantity of litter is requiſite to beaſts houſed, than when they are in a wet, dirty yard.

*A System of Recurring Crops; in which one Field is in Meadow whilst the others are interchanging Crops: with a Plan of a Farm Yard, and Buildings, adapted to it.*

To farmers approving of the new methods of cultivation, but who contend that a part of the arable ground ought to lay out a number of years at perfect *reſt* from being broken up or yielding any thing elſe than graſs, the following deſign is ſubmitted; the rather, as a permanent meadow of ſpire-leaved graſſes, certainly is very ad-

E van-

Tour 412.) where 8 loads an acre on a *ſandy loam*, anſwered greatly. At another place, 40 loads of *clay* an acre, on rich, light, mixed loam, laſted 40 years. All whereof was in a country ſaid to underſtand and to have experienced *marl* more than moſt; and they there prefer the *clay* to marl, where both are to be had. This is important! and impels me to repeat it, that farmers are to *make trials* of their ſoils, in ſmall parcels, with *clay*, and other ſubſtances. Alſo trials of trench plowing, of various depths.

vantageous; eſpecially if it be only cut for hay and never trod cloſe in paſturing, except it may be, diſcretely, the aftermath, and alſo that it be ſupported by manures. Any ſound land may be brought to yield crops of graſs: but clover, requiring renewal every ſecond year, is inſufficient for a ſtanding or permanent meadow.

The preſent deſign allows a ſeventh of time in graſs; and is accompanied as well with the ſyſtem of recurring rotations of crops, as with eſtimates and obſervations which may afford uſeful intimations.

| | Acres. | |
|---|---|---|
| Fds. | 30 | *Timothy*, in *ſtanding meadow* during the years in which the other fields are under a change of crops. |
| | 30 | *Maize*. In July buckwheat and clover ſeed are ſown on it: the maize having been previouſly *manured*, plowed, harrowed, and occaſionally rolled; and left quite *level* without the leaſt hill or ridge.* |
| | 30 | *Clover*. |

30

* For this, ſee a new mode of cultivating maize, page

30 *Wheat.*†

30 *Clover.* Gypſumed in the ſpring; if not before on the clover ſown on the maize.‡



† Mr. Middleton, farmer on Pool's Iſland, informs me, that in December he gives his wheat a top-dreſſing of freſh dung from the ſtable, and then rolls it. In the ſpring he rolls it again, and "finds the wheat is improved, and greatly relieved from the *Heſſian fly*. The dung "gives vigour to the plants; and he thinks rolling ſmothers or cruſhes many of the eggs or maggots."—Mr. Middleton, bred to the ſea, is alſo an excellent farmer; and has practiſed the above two years, for oppoſing the fly.

‡ Where the manurings are *frequent*, the quantity each time applied may be moderate: provided that on the whole round of crops they ſhall amount to a full manuring. The gypſum in this caſe may be only a buſhel; the lime 20 to 40 according to the quality of the ſoil; the powdered limeſtone (or ſhells) 6 or 8 buſhels; the dung 10 loads. Theſe annually applied to the fields in rotation, one after another, will keep ground in good heart, where exhauſting crops do not predominate over mild crops. Gypſum is not a manure to *all* ſoils. So of trench plowing; which improves moſt ſoils, but not all: and every Farmer ought to try lime, gypſum, raw limeſtone or oyſterſhells in powder, clay, marl, &c. in ſmall, before he pronounces they are or are not manures to his particular ſoil.

30 *Rye* and barley.§ A top-dreſſing with raw limeſtone, or ſhells, pulverized.

30 *Turnips* and *potatoes* 18 acres, *beans* or *peas* 12 acres.

30 *Buckwheat* plowed in: and in July ſown for crop—Timothy ſeed on it.‖

——240

20 Homeſtead; including manſion, farmyard, ſtackyard, orchard, &c.

260 acres, arable and meadow.

*Products*

§ Rye, for its meal and ſtraw to live ſtock: barley for beer.

‖ On covering the buckwheat ſown for crop, loſe no time in ſowing the timothy, leaving it uncovered. The ſame of clover on buckwheat. Settling of the ſoil; or rains, dews, or wind, will ſuffice for bringing the graſs ſeeds to grow; or run a light roller over it: but beware that the ſoil is not left to crumble down or ſettle before the graſs ſeed is ſown. Suffer no time to run between ſowing the ſeeds of buckwheat and graſs: but perform the laſt as in the next breath after the buckwheat is harrowed in. If however, the ſun be very powerful, it may be ſafer to cover the graſs ſeeds with a very *light* harrow, or *light* roller. Many graſs ſeeds are covered by even ſmall lumps of earth; and therefore more ſeeds are requiſite than when left altogether uncovered.

*Products of the Crops, by Estimation.*

| | | | | | | c. |
|---|---|---|---|---|---|---|
| Maize | 30 acr. | at 20 | bush. | 600 | at 50 cents | 30000 |
| Wheat | 30 | 12 | | 360 | 100 | 36000 |
| Buckwheat | 60 | 12 | | 720 | 50 | 36000 |
| Rye & Bar. | 30 | 15 | | 450 | 60 | 27000 |
| Potatoes &c. | 30 | (pot. 4[a].=800[b]. turnips 14[a].= 5600[b]. at 8[c].=51200[c]. Beans 12[a]=140[b]. =14000[c].* | | | | 65200 |
| Hay | 60[a] | 120 T. | | | at 1000[c] | 120000 |
| Clover, *ſoiled*, | 24 | mow 4= | | | | 60000 |
| Straw, huſks and fodder of 90[a]—excluſive of buckwheat ſtraw. | | | | | | 18000 |
| Buckwheat ſtraw of 60[a] | | | | | | 10000 |
| | | | | | | 402000 |

Which 402000 cents, by dotting off the two figures on the right hand are 4020 dollars.

*Crops*

* An acre ought to produce above 400 buſhels of turnips or 200 of potatoes. Turnips when early thinned to about 12 inches apart, and well hoed, yield above double the quantity, and more perfect than what are ſcarcely at all thinned or hoed. Country people have not reſolution to cut up plants in hoing, however thick they ſtand; as it ſeems to them robbing the ground. In eſtimates of crops, the coſt of cultivation or loweſt country price of products, for country conſumption, is to be reckoned, without any regard to town price. For what is conſumed by cattle on the farm, the value is received out of

*Crops expended in Food to Live Stock.*

Stock cattle are *kept*: others are *fattened*. The feeding is different. Cattle *kept*, need no kind of grain; and it would be waſte to give it them; nor even *hay*, unleſs to cows about calving time. *Straw* with any *juicy* food, ſuch as roots or *drank*,† abundantly ſuffices for keeping cattle in heart through winter, provided they are ſheltered from cold rains. Mr. *Bakewell* kept his fine cattle on *ſtraw and turnips* in winter.

To

the ſtock maintained and fattened, including their dung and urine. An acre of 200 buſhels of potatoes at 10 cents a buſhel gives 20 dollars; when an acre of 12 buſhels of wheat at 100 cents gives but 12 dollars. The feeding articles of produce being fairly expended on the farm, the ſoil is the better of it; but when they are ſold off, the ſoil is ſoon weakened; becomes unproductive, and keeps the farmer poor as itſelf.

† The word *drank* is given us by Count Rumford, who underſtands as well the German as the Engliſh language; and in a work of his in Engliſh, *drank* is preferred, for diſtinguiſhing his compoſition from ſimple water as a drink. It is therefore preferred in the preſent work.

To the ſouth of Pennſylvania, ſtock cattle are kept, though indeed meanly, in winter on corn-huſks and ſtraw, without roots or drank or any aperient or diluent material that could correct the coſtive effect of the dry food; unleſs mayhap a nibble of a few weeds and buds, when they ramble abroad poaching the fields, and expoſing themſelves to debilitating cold rains and ſleet. Water, often too cold to be drunk by them, is their only diluent: and how common is it to ſee them only ſip and then turn away from their water, in winter; eſpecially when put to it early, before the ſun has reduced its cold.

HORSES:

| | | Straw: Acres | Hay: Tons. | Turnips: Acres. | Potatoes: Acres. | Meal: Buſhel. | Graſs: Acres. |
|---|---|---|---|---|---|---|---|
| HORSES: | winter *kept*, 4 | | 7 | | | | |
| | ſummer ſoiled, | | | | | | 1 |
| CATTLE: | winter *kept*, 70* | 90 | | 8 | | | |
| | cows, about calving time, | | 24 | | | | |
| | *fattened*, 8 | | 14 | 1 | | 100 | |
| | ſummer ſoiled | | | | | | 20 |
| SHEEP: | winter *kept*, 90 | | 24 | | | | |
| | *fattened* 38 | | 6 | | | 130 | |
| | ſummer, ſoiled 90† | | | | | | 5 |
| HOGS: | winter *kept*, 8 ſows and boars | | | | ½ | 80 | |
| | 30 ſhotes till May: 3 to 8 m° old | | | | ½ | 150 | |
| | *fattened*; 2 ſows: hogs 30 of 10 m° 30-15 m° | | | | 3 | 800 | |
| | ſummer, ſoiled 8: and ſhotes 30 | | | | | | 2 |
| Expended in lieu of cut graſs, in bad ſeaſons; and reſerved till new harveſt; and for ſaddle and carriage horſes; and for food to ſtrangers or viſitors horſes, | | | 32 | | | | |
| Remaining, unapplied, here | | 60 | 13 | | | 460 | 2 |
| | | 150 | 120 | 14 | 4 | 1720 | 30 |

* † See the next page.

Dung

Dung yearly procured from the above ſtock of cattle, ſheep and hogs, may be; from

* Mr. Cook (drill inventor) ſupported in winter, 40 *cattle* near 7 months on 30 *acres of ſtraw*, cut into chaff, and 4 *acres of turnips*; and ſaved from them 400 tuns of dung. 28. E. Rev. 89. Theſe cattle had their *ſtraw cut ſmall*, but the turnips were *raw*. Had the cut-ſtraw and turnips been *boiled* together in water with ſalt, as a *drank* (a term convenient to be retained) it would have been of more advantage to the cattle. A drank for keeping cattle may be made thus: roots, chaff or cut-ſtraw, and ſalt, boiled together in a good quantity of water: the roots cut or maſhed. The cattle drink the water, and eat the reſt. Drank for *fattening* cattle, thus: roots, meal, flaxſeed (ſee page ) chaff or cut-ſtraw and ſalt, well boiled together, in a plenty of water. If given warm, not hot, it is the better. The 70 full eaters are thus ſtated:

| | | | | |
|---|---|---|---|---|
| Cows | 48 | Calves | 8 | |
| Bulls | 2 | Yearlings | 8 | |
| Oxen | 14 | Two years | 8 | |
| | —64 | | —24 | =14 |
| | | | | 64 |
| | | | | —78 |
| | | Off the fattened | | 8 |
| | | Winter full eaters | | 70 |

† Lambs to drop about 20th March, 60: whereof raiſe 38 for ſupplying the places of 13 ewes and rams, killed at 4 years old, and 25 weathers killed at 2 years old. There may remain 20 lambs for ſale. The winter *kept* ſheep will be 52 ewes and rams, and the 38

from the cattle 820 loads; the ſheep, 180; the hogs 60: in all 1060 loads.* At 10 loads

lambs; together 90 head. The ſame numbers are ſoiled in ſummer. Not having ſeen any inſtance of *ſheep ſoiled*, I only believe from certain circumſtances and facts ſtated by writers that it would anſwer well, as with other beaſts: and in Flanders, it is ſaid, "their ſheep are *always* in ſtables, and every day let into the yard, to breathe the air." 20 An. 466.—Sheep are a neceſſary variety of live ſtock. Their meat is generally valued, and by many preferred. Their wool is eſſential in clothing. Their dung is rich. Hogs alſo give rich dung; and when attentively ſaved it is in good quantities. Sheep are to have hay or corn blades in winter with roots and ſalt: for fattening them add *Indian meal*. How would flaxſeed or its jelly agree with ſheep? The turnips and potatoes expended above, are rather ſcanty; though conſiderable, where they never before were ſo applied.

* Cattle in England, when *fully littered*, have given twelve large loads of manure, each, in the courſe of a *winter* only. During ſummer they ran on paſture. But in the propoſed caſe of cattle being houſed through the whole year, though but partially littered, the dung being well ſaved, may be expected to amount to much more than 10 loads each. Mr. Bakewell was not in the practice of littering his cattle, till ſome years before his death: but he carefully ſaved their dung, by *daily* ſhovelling it up from their ſtalls, and ſtoring it on the dunghill. A man and a boy attended to 40 head of grown cattle. Not having ſeen dung ſaved from ſheep or hogs, my calcula-

loads an acre, the 1060 loads, together with the other manures propoſed, is dung enough for 100 acres. Twenty loads of ſuch rich dung, to an acre, would be a good manuring alone: but the 1060 loads, laid on one of the fields of 30 acres, give above 35 loads an acre; which are abundant. A variety of manures is deſirable: gypſum, lime, rawlimeſtone and ſhells in duſt, marl, clay, &c.

If no more live ſtock were kept on the farm, than ſhould be neceſſary for labour and food, and all the crops were ſold off, the income for a *few years* would conſiderably exceed what could be derived from a full

tion reſpecting their dung is at random. Reckoning 5 ſheep to a cow, it is then ſuppoſed they make but half as much dung as one cow, and the eſtimate ſhould be under rather than over rated. The dung at the rate of five hogs to a cow, 68 hogs ought to yield 136 loads: but there are only 60 of hogs dung ſtated. Great *attentions* are due to ſaving their dung. Though hogs ſeem to make much dung, yet it is apprehended it will be long ere old habits will give way to American farmers adopting proper methods of ſaving this valuable article of produce.

full ſtock of beaſts kept on the farm and fattened. But how great the injuſtice to the ſoil! to what a heartleſs, unproductive ſtate it ſoon would be reduced!—This it is which has ruined the fine lands in Maryland and Virginia—plowing much land, and ſelling off the produce, without reparation to the ſoil—This it is which, with idle habits, rivets on country families perpetual want, poverty, and debts, oft-times in the midſt of a deceitful appearance of plenty!

It is preſumed the ſoil of the farm under conſideration is in good heart; and in a way of becoming better from a mode of farming far ſuperior to what is ſeen in the countries, of America, ſouth of Pennſylvania. In Pennſylvania and the eaſtern ſtates, quick renewals of clover, in entire *fields*, are coming into practice; and with various manures are ſeen to reſtore abuſed ſoil, and yearly improve it. But in the countries of noted bad huſbandry there is only ſeen, what is bragged of, here and there

there a *lot*, a *patch* of clover: a narrow aim at doing ſomething. It feeds a favorite horſe; but nothing comes of it towards improving the *fields*. A third or fourth of the whole arable of farms ſown with clover *yearly* upon ſmall grain, and cut *one ſeaſon*, and then plowed in together, with the remains of old ſtubble, might be expected gradually to improve ſoil from poor clover nibbled to ſtout clover cut. Whilſt this courſe of improvement is in practice, all ſorts of manures are to be unceaſingly added. Here let it be repeated that, it is not immediate income alone which the provident farmer aims at: for whilſt he wiſhes to obtain annual full crops, he knows it is neceſſary for the purpoſe, that the ſoil ſhould be preſerved in full vigour. His cares are therefore chiefly applied to the means of preſerving and improving the productive powers of the earth: and he ſees that no random purſuits can enſure a ſucceſſion of advantageous huſbandry.

*Income, from the Products; by Estimation.*

| | | C. | C. | C. |
|---|---|---|---|---|
| From Wheat. | Sold | | | 36000 |
| Cattle. | Veals 40 at 400 cents | 16000 | | |
| | Butter, 80lb. a cow, 3840lb. at 20 C. | 76800 | | |
| | Beef, 6 cows, 2 oxen, at 2275 C. | 18200 | | |
| | | | 111000 | |
| | Dung, 10 loads each, 820 at 50 C. | | 41000 | |
| | | | | 152000 |
| Sheep. | Wool 400lb. at 25 C. | 10000 | | |
| | Muttons 38, at 400 C. | 15200 | | |
| | Lambs 20, at 150 C. | 3000 | | |
| | | | 28200 | |

| | | | |
|---|---|---|---|
| | Dung, 180 loads, at 50 C. . . . | 9000 | |
| | | | 37200 |
| Hogs. | Fat 2 ſows, 30 hogs of 10m°.—30 of 15m°.—10000lb at 6 dols. per 100 | 60000 | |
| | Lard, of the inteſtines . . | 3000 | |
| | | 63000 | |
| | Dung, 60 loads, at 50 C. . . . | 3000 | |
| | | | 66000 |

| Dls. Cts. | | |
|---|---|---|
| 2912.00 | Total income . | 291200 |
| 1164.80 | Expences, 40 per cent | 116480 |
| 1747.20 | | |
| | Net | 174720 |

*Illustration, of the whole round of Crops during 7 years; with one Field continually in Meadow, during the Time of the Rotation.*

| 7 Yrs. | A | B | C | D | E | F | G | H | 81 |
|---|---|---|---|---|---|---|---|---|---|
| '91 | Tim. | Maiz | Cl. | Wh. | Cl. | Rye. | Po. | Bw. | |
| 2 | Tim. | C | W | C | R | P | B | M | |
| 3 | Tim. | W | C | R | P | B | M | C | |
| 4 | Tim. | C | R | P | B | M | C | W | |
| 5 | Tim. | R | P | B | M | C | W | C | |
| 6 | Tim. | P | B | M | C | W | C | R | |
| 7 | Tim. | B | M | C | W | C | R | P | |

The crops of the *first year*, of this table, are particularly treated of in page 66; where it is seen that the rye field contains some barley; the potatoe field, some turnips and beans or peas: the maize field also gives buckwheat. The buckwheat field, which is next after the potatoe field, is sown with timothy seed, for giving a new meadow

meadow next year, which like the former is to ſtand out the renewed rotation of crops. This new meadow will be on field B. The next on field C. and ſo on.

In deſigning a recurring round of crops, their ſucceſſion is to be tried on a plan or table, drawn for the purpoſe, by reading the table, and ſlightly marking it with a pen diagonally downward, and ſeeing that they run the ſame throughout; and moreover that there are not more nor leſs in the number of each ſort in a year, any where in the table, than are in the firſt year among all the ſeven fields, or are in B field, during the ſeven years rotation. The table anſwering in theſe particulars, warrants a true, orderly courſe of crops and employment, which will recur for ever.

The following is a ſketch of a ſyſtem of crops; in which *one field* is 7 years in *hemp*, and the ſame field is followed with *timothy* meadow another 7 years; whilſt other 7 fields are in annual changes of various crops: ſo that of the 9 fields, 2 are in hemp or timothy during 14 years; and 7 in various rotation, recurring crops. Every field coming into hemp and timothy in time.

| Years. | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1791 | He. | Tim. | Maiz | Cl. | Wh. | Cl. | Rye. | Bk. | Po. |
| 92 | He. | Tim. | C | W | C | R | Bk | P | M |
| 93 | He. | Tim. | W | C | R | Bk | P | M | C |
| 94 | He. | Tim. | C | R | Bk | P | M | C | W |
| 95 | He. | Tim. | R | Bk | P | M | C | W | C |
| 96 | He. | Tim. | Bk | P | M | C | W | C | R |
| 97 | He. | Tim. | P | M | C | W | C | R | Bk |
| | × | × | × | × | × | × | × | × | × 1st |
| 98 | Tim. | M | C | W | C | R | Bk | P | He. |
| 99 | Tim. | C | W | C | R | Bk | P | M | He. |
| 1800 | Tim. | W | C | R | Bk | P | M | C | He. |
| 1 | Tim. | C | R | Bk | P | M | C | W | He. |
| 2 | Tim. | R | Bk | P | M | C | W | C | He. |
| 3 | Tim. | Bk | P | M | C | W | C | R | He. |
| 4 | Tim. | P | M | C | W | C | R | Bk | He. |
| | × | × | × | × | × | × | × | × | × 2d |
| 5 | M | He. | C | W | C | R | Bk | P | Tim. |
| 6 | C | He. | W | C | R | Bk | P | M | Tim. |
| 7 | W | He. | C | R | Bk | P | M | C | Tim. |
| 8 | C | He. | R | Bk | P | M | C | W | Tim. |
| 9 | R | He. | Bk | P | M | C | W | C | Tim. |
| 1810 | Bk | He. | P | M | C | W | C | R | Tim. |
| 11 | P | He. | M | C | W | C | R | Bk | Tim. |
| | × | × | × | × | × | × | × | × | × 3d |

The ground, well prepared, is in April ſown with *hemp*, and for 7 years ſucceſſively, after being plowed and harrowed in the fall and ſpring, ſometimes with manure added, it is repeatedly in hemp.

Timothy is to follow hemp; ſo that in the ſeventh year, the hemp being inned, and in early Auguſt the ground being plowed and harrowed fine, you ſow *buckwheat* and *timothy* ſeeds, after the hemp crop.

This is continued 7 years in *timothy*, mowed once a year for hay; and now and then receives a top-dreſſing of manures. When the 7th crop is off, plow in the ſward neatly, and harrow and roll it in the direction of the furrows. The ſward being duly ſmothered, heats and rots if done before cold weather. It reſts thus till April for perfecting the rotting. Then liſt, croſs, and plant maize.

Potatoes manured and well cultivated, clean and mellow the ground perfectly. Hemp is always to be begun on a new field, *after manured potatoes*.

Hemp leaves the ground clean and mellow, therefore *timothy* is renewed after hemp, in Auguſt or July; the ſeeds ſown on buckwheat, which is a neceſſary ſhelter to the young timothy.

The *maize* culture cleans the ground, and pulverizes it after timothy, for future changes of crops.

## *A FARM YARD,*

### *Adapted to the Preceding System.*

It is an eſpecial object in this deſign that the whole yard and its buildings, ſhould be in view from the manſion; and that they be conſtructed at a proper diſtance, neither too near nor too far from the manſion. The food ſhould be near to the houſed live ſtock, for readily diſtributing it. The yard ought to be compact; and the doors of the buildings, and the gates of the yard, ſeen from the manſion.*

The

* It is not to ſave ground that compactneſs is here deſired; but that the attentions due to the live ſtock may be performed in the readieſt and beſt way. A yard containing cattle always houſed, is never to be littered with ſtraw, but all litter careleſsly dropt on it, is to be raked off, for ſecurity againſt fire dropt on the way to the boiling houſe; and the beaſts are not ſuffered to ſtroll about waſting dung and urine. When let out and watered, they are to be inſtantly returned to their ſtalls, regularly in detachments, one ſet after another. On paper, an octagon form of a farm yard is pleaſing to the eye: but the above is preferred.

The *homeſtead* includes this yard; together with its ſtackyard, the garden, nurſery, orchard,* and ſome acres for occaſional uſe: ſuch as the letting mares, or ſick beaſts run in, at liberty.

### *Explanation of Plate.*

1. Manſion.
2. Kitchen, Oven, and Aſh-hole.
3. Poultry-houſe, and yard.
4. Wood-yard.
5. Laboratory (Labórature)
6. Milk-houſe.
7. Ice-houſe.
8. Pigeon-houſe.
9. Cloacas.
10. Family yard.
11. Pump.
12. Watering troughs
13. Sow and Pig ſties.
14. Cow-houſe.
15. Boiling-houſe.†

16.

* *Beer* is always certainly attainable on farms; but *cyder* is very precarious: therefore no more orchard ſhould be eſtabliſhed than would plentifully ſupply the farm with ſummer and winter fruit, for cookery and to eat. But in great fruit years, cyder may be made for family conſumption, without ever laying out for it in quantities. *Beer* is the moſt wholeſome of all made drinks,—the chief in all the countries where robuſt health is the moſt conſpicuous. It proved on my Wye farm, very excellent to harveſt men; who preferred it to rum; and it kept them in ſteady good heart, without any inſtance of ſuch irregularity as rum commonly produces.

† The Boiling-houſe here may be too near to combuſtibles, hay and ſtraw. Leaving this ſpot for *Swill-ciſterns*

16. Hogs.
17. Stercories.
18. Barn.
19. Sheep-houſe, and yard.
20. Chaiſe-houſe and ſtable.
21. Waggon and cart-houſe.
22. Implements of huſbandry, houſe.
23. Workſhop.
24. Herdſmen's hovel.
25. Granary.
26. Stable, for farm.
27. Area of Bridge and vault.
28. Bees.

a. Treading-floor.
b. Straw ricks.
c. Hay ricks.
d. Root pits.

The *Manſion*, is airy on every ſide. The offices, being on the northeaſt and northweſt *angles*, leave the manſion open to the ſouth, eaſt, and weſt, in a clean lawn: and from the north rooms there is a view of the farm yard and its buſineſs.

The *Kitchen*, has its oven and aſhhole: this laſt opening out of doors, for avoiding the diſperſion of aſhes, in the kitchen, on moving them for uſe. No ſtairs proceed from the kitchen; as it would be a paſſage to

*or tubs*; the boiling would be better at 29. Which might, ſo near the manſion, alſo contain a brewing and diſtilling apparatus. If *hemp* is in the round of crops, it may be *ricked at* 30, and *broke and ſwingled at a houſe at* 31.

to duſt and down from the bed-rooms to the kitchen: the ceiling ought alſo to be tight. Lay an arch of brick over the aſhhole and oven, as a barrier againſt fire, the ſtairs may be over the arch, from without. Indeed here might a *waſh-houſe* have its roof extended, for covering the ſtairs. Inadvertently, the waſh-houſe is omitted in the plan.

The *Poultry-houſe and yard* are roomy; and kept ſweet by being frequently cleaned out; and freſh ſand and gravel are ſtrewed in the yard. Their food is to be ſteamed potatoes and meal, in winter; cut graſs, potatoes and a little meal in ſummer. Poultry ranging at large, feed on grain, ſeeds, graſs and inſects. Gravel is neceſſary to them.

The *Laboratory* (Labórature), is conſtructed from one invented by my valuable friend, the late Mr. *Lawſon*, of Fonthill, which anſwered many purpoſes in country houſe-wifery. No better name occurs for diſtinguiſhing it from other houſes on farms.

farms. See a ſection of the houſe in plate No. and a further account of it, page .

The *Milk-houſe*, adjoins the Laboratory, which is a ſcalding houſe to it. It may be two feet under ground. The offal milk is conveyed to the pigs in wheel-barrows, and might be conveyed in a tube, under ground, to the pig-ſtie. Ice is at hand for hardening butter as it is taken from the churn and worked on a cold marble table. Water cold from the pump is conſtantly uſhered, through pipes, to an upper ſhelf, and paſſing round the room, falls on the under ſhelves and runs off.

The *Ice-houſe*, is to be detached from the milk-houſe, that it may be clear of all moiſture, and receive air on all ſides. The ice-houſe at Gloſter point, near Philadelphia, ſtrongly recommends that it be moſtly above ground. Four feet under ground, ſix above ground and twelve ſquare, would hold 1440 ſolid

ſolid feet: which is enough for family and milk-houſe purpoſes, though very freely expended.

*Pigeon-houſe.* Pigeons feed expenſively, when it is alone on the corns: but they alſo feed on many wild ſeeds. They make an agreeable variety on the table; but ought not to be ſuffered to become too numerous; and therefore their houſe is to be of a moderate ſize.

The *Family-yard*, is a barrier againſt farm-yard intruſions. It is covered with a clean, cloſe ſward of ſpire graſs. Its margin alone may be admitted to grow flowers. It is fenced by a ſunk fence; on the top whereof may be, if neceſſary, a low, light paliſade; which with the bank may be hid by roſe trees planted in the ditch, which is to ſlope gently up towards the manſion. The white roſe buſh or tree is the hardieſt and handſomeſt ſort, and ſomething the talleſt.

The

The *Pump* ſerves both family and farm-yard purpoſes, working by a brake or handle on either ſide of the paliſade. This large expenſe of water is advantageous to its quality. The pump nozle delivers the water 5 or 6 feet above the ſurface of the ground: and at every time of its being worked, a portion of the water is delivered into a veſſel, from whence proceeds a tube, three feet under ground (for avoiding froſt and heat) to the kitchen, where ſome of it is depoſited in a ciſtern: the reſt proceeds alſo under ground, to the milk-houſe; only leaving on the way a ſmall part in a receptacle of the manſion for waſh-baſon uſes. For the boiling-houſe, which takes much water, either the water muſt be conveyed through pipes, or in caſks on barrows, or a pump is to be placed near the boiling-houſe.

The *watering troughs* are to have plugs in their bottoms; that when the cattle have drunk, the remainder of the water may be immediately let out; that in winter it may not

not freeze, and in ſummer it may not be warm or ſtale: and the cattle are returned to their ſtalls, and *not allowed to ſtroll at all in the yard* to no purpoſe, but a waſte of dung and urine. Fancy induces a pretty current ſuppoſition that all animals require ſome conſiderable range and change of place; which indeed, as far as for the ſeeking food, diſperſed as it is in their wild ſtate, is true. The exerciſe of their legs and their wings are ſo far eſpecially neceſſary to them, as well as for avoiding their enemies. But, experience proves that they exiſt in perfect health and good plight when cloſely confined, in no want of food, as long for aught that is known as if they had continued at large in their wild ſtate. Cattle, horſes, and hogs prove this in many countries: and the horſe, like the deer, is of a very active, wild, and roving nature. Sheep are eſpecially imagined to require ſuch ſhifting of place: which may have ariſen from the very early and general practice of letting them paſture at large. They are in flocks commonly too numerous

merous to be conveniently houſed, and being hardy are not thought to require it. But above all the habit, continued down from the firſt of time, of people called ſhepherds ſtrolling after flocks of them, for the ſake of ſcattered ſpontaneous food, is the principal ſupport of the ſuppoſition. On the other hand, it is proved by the practices of the huſbandmen of Flanders and ſome other countries, that ſheep thrive well when kept up in houſes the year through: and Mr. Bakewell ſcarcely, if at all, ever let out his fine rams, except in the month of their being put to the ewes. Even the heath fowl, ſo wild and roving as they are, have been domeſticated, under a degree of confinement very oppoſite to their habits in their wild ſtate. A gentleman of Scotland, and his lady, of high conſideration, inform me, that they have ſeen the black cock of that country, in the tame ſtate in a yard. A Mr. Lewis Duval, formerly of Hawling's a branch of Patuxent river, Maryland, aſſured me that he had *grouſe*, quite tame in his yard, and that they

they raiſed young ones. Their manner of courtſhip as related by him was ſingular. The male was long in making his advances and coaxing the hen, in vain till he ſuddenly turned on his back, ſhrieked, and quivered his wings as if in a fit of agony. She then came up to him, walked round and looked on him with ſeeming compaſſion.

The *ſow and pig ſties*. The offal milk may be conveyed to the troughs in the ſties, from the milk-houſe, by pipes under ground or otherwiſe. Sticks in a frame are ſo fixed over the troughs, rack like, that the hogs cannot get into the troughs, further than their mouths. The ſwine are to be kept clean, and littered in their ſhelters. Salt may be offered them in the pen.

The *cow-houſe*. Hay and ſtraw are ricked at the back of it; the houſe is 16 feet wide, including its paſſage; 7 feet pitch for the cattle to ſtand under; and above this 7 or 8 feet pitch to the joiſts and rafters. Into this upper part ſtraw and hay

are

are pitched up, to be at hand in all ſorts of weather: from whence it is thrown to the paſſage, to be given to the cows. Wheelbarrows of drank paſs along the paſſage to the cattle cribs. Theſe barrows carrying heavy tubs or barrels of drank, would paſs with more ſafety and ſteadineſs, with two wheels; ſuch as every farmer can make, independently of wheelrights, by doubling inch plank. In one corner of each crib is to be at all times a ſalt-lick in a firm maſs of the pureſt impalpable potter's clay or fuller's earth ſaturated with ſalt. The very important article, *ſalt*, is ſhamefully neglected, in common. A ſtercory is in front of the cow-houſe, within eaſy pitch of dung from ſhovels. Carts never need to paſs between the ſtercory and houſe: ſo that the ſpace is deſigned for the cattle to paſs along to their ſtalls. The dung is carted away from the further ſide of the ſtercory.

The *boiling-houſe* contains alſo the conveniences for *ſteaming*. Care is to be taken that

that fire cannot be blown about, and mix with any ſtraw neareſt to it. For the boiler and the apparatus for ſteaming, ſee plate .

The *ſtercories*, may be 4 feet under ground, 2 or 3 above; and walled. Over them may be ſupported, by ſhort ſtandards, a covering of bruſh or ſtraw, which will exclude the ſun, but let through rain.

The *barn*, 30 feet wide, has a paſſage its whole length, and ſtalls on each ſide of the paſſage. Straw is cut in the paſſage, and the cattle are fed from it. At the ſouth end of the houſe, a bridge is raiſed from the ground up to the ſecond floor, about 8 feet from the ground. The bridge is 30 feet wide, and has an eaſy aſcent for loaded waggons. Under it, next to the houſe, is a vault, for ſtoring roots, 30 feet by 12 or 15, and 6 or 7 feet deep. At the end of the paſſage a door opens into the vault. The ſecond ſtory is high enough for thraſhing in.

The

The *ſheep-houſe and yards*, are to be roomy and airy in diviſions. Back of the houſe is the hay requiſite for the ſheep, in ricks. Its ſtercory is at one end. The dung is to be carried to it in large wheel-barrows.

The *granary*, had better be longer and narrower than in the drawing; with diviſions acroſs it, without any communication between them; by which the different corns will be kept from mixing, and a general acceſs to them will not happen when only one ſort is to be carried in or taken out. A lock is to be to each of the ſeveral out doors. Windows facilitate thefts. There needs none to the lower rooms, if an airhole be between every two joiſts, cloſe under the ſecond floor, the vapour and heat naturally aſcending will paſs off at the airholes. The pitch of the rooms may be only $6\frac{1}{2}$ feet.

*Bees.* From inſtructions given by an Engliſh writer, I tried bees in *lateral boxes*. On the firſt experiment, in the morning of the

the firſt of November 1787, after a cold night, the bees being all houſed, a pair of the boxes were leaned on one ſide, and ſhewed the bees were all in one of the boxes: on which the other box was taken away; and proved to be full of comb and honey, perfectly pure without an atom of any thing foreign. Not a bee was killed or even diſturbed. This was on Wye Iſland, where the bees had half a mile to fly over the river before they could reach the main. Many at times muſt have periſhed, in rains and ſtorms, whilſt they were endeavouring to croſs the river; and the diſtance in returning from the fields exhauſted their ſtrength and retarded returns of honey, ſo as to render their particular ſituation very ruinous to them. In the next ſummer, a very wet one, they were reduced; and it being a bad ſeaſon for honey, they all died in the winter, though no honey had been taken from them. The boxes were exact cubes of 10 inches. The method is promiſing.

The *treading-floor*. Though but ſix to eight horſes ſhould tread on it, yet it ought not to be of a leſs diameter than 80 or 90 feet. But the track and bed of wheat is narrowed to 12 or 15 feet. I was long and greatly prejudiced againſt *treading* wheat. But experiencing the advantages of getting out the crops with *ſpeed*, and very *clean* when on a permanent well preſerved floor, with horſes gently trotted in ranks, diſtant and airy each rank from the others, the preference in my opinion is in favour of treading, over the moſt expert thraſhing with flails. So much ſo that, conſidering the greater opportunities of pilfering, and lengthy troubleſomeneſs of thraſhers, I would prefer treading to having my large crops thraſhed for nothing.

## *CLOVER.*

This is an important article in the improved ſyſtem of crops in rotation: but its ſeed bearing ſome price or coſting ſome labour to obtain it, renders it a bugbear to com-

common husbandmen, whose habits have diverted them from a large use of it. It is indeed absolutely necessary that clover should be a common crop in rotation with other articles of crop, in entire fields. It is hoped there are farmers spirited and determined enough to defeat the objections; and who will consider the cost not chargeable merely to the crop of clover, but to the whole round of crops; the clover being so essential thereto that without it the soil, the cattle and the corn-crops would greatly suffer; and the farmer's income, his reputation, and his independency would be lessened.

If 4lb of clean clover seed, when sown with such a box as is described below, clothe the ground as well with plants as 16 or 12lb sown in the common broad-cast way and covered, of which I have had a little experience, then a bushel of seed will sow 15 acres. Thirty loads of dung (unbought) would cost much more for loading, carrying and dispersing them on the field. The farmer can ameliorate 100 acres with

clover more certainly than he can 20 from his ſcanty dung-heap; and moreover, in the time his clover is ſheltering the ſoil, perſpiring its excrementitious effluvium on the ground, dropping its putrid leaves, and mellowing the ſoil with its tap roots, it gives full food to the ſtock of cattle, keeps them in heart, and increaſes the dung-hill. Nor is the amelioration by clover very inferior to that by dung, as this is commonly managed. In ſome reſpects it is preferable. With dung innumerable ſeeds of weeds are carried out and ſown on the fields: not ſo of clover, when the ſeed has been properly cleaned. Clover is the beſt preparative for a crop of wheat. Dung inclines wheat to run more into ſtraw than full grain. Wheat on clover has the beſt grain and the fulleſt crop.

A farming friend gave me a pleaſing account of an improved method for gathering and cleaning clover-ſeed. In general the heads of the clover are rippled off, by a ſimple machine moved by a horſe, at the rate

rate of 5 acres of them in a day. The heads are carried to an oil mill, having two ſtones rolled in the manner of a tanner's bark-ſtones which ſeparates from the haulm, five buſhels a day.

Of two fields, 50 acres each, in clover, one is kept up for giving ſeed in Auguſt, after cutting the early growth. In 10 days the 50 acres of ſeed may be gathered at a ſmall expence; and in 10 more, 50 buſhels may be ſeparated from the haulm, and cleaned with a fan or with ſieves. Whatever may be the medium produce, I count on only one buſhel of ſeed an acre.*

A box

* Mr. *L'Hommedieu*, of New-York, ſays: "The ſeed is collected both from the *firſt* crop and from the *ſecond*: but the largeſt quantity is from the *firſt*. By ſowing three or four pounds of clover ſeed to the acre, on light loamy ſoils which yield 8 or 10 buſhels of wheat or rye to the acre, the clover will not be profitable to mow: but ſtanding thin on the ground, the heads will be well filled with *ſeed*. Theſe fields are kept up the next year, till the ſeed is collected. When above one half of the field has changed its colour by the drying of the clover heads, then begin to collect them; which is done by

A box for ſowing clover ſeed on wheat *beds* (rather than ridges) ſeven feet wide, including a machine drawn by a horſe and guided by a man or boy, who will collect from the field by this means, the heads of clover growing on five acres, in one day. The machine (ſee the plate) is an open box of about 4 feet ſquare at the bottom, and about two feet high on three ſides. The forepart is open; and on this part are fixed fingers, ſimilar to the fingers of a cradle, about three feet long, and ſo near together as to break off the heads from the clover ſtalks, which are taken between thoſe fingers. The heads are thrown back into the box, as the horſe walks on. The box is fixed on an axle-tree, ſupported by two ſmall wheels about two feet diameter. Two handles are fixed to the box behind, by which the man or boy at the ſame time he guides the horſe, lowers or raiſes the fingers of the machine, ſo as to take off all the heads from the graſs; and often as the box gets full of heads, they are thrown out, and the horſe goes on again. This machine is ſeldom uſed to collect from the *ſecond* crop. Thoſe who do not own one, ſuppoſe the expenſe of hiring with the loſs of ſeed trod down, nearly equal to the expenſe of mowing the ſecond crop. On rich lands, ordinarily, no ſeed comes of the firſt crop. If the land is lightly manured or otherwiſe very good, the firſt crop of graſs is ſo *thick* that it yields no ſeed worth gathering: but the ſecond crop being ſhorter and thinner is commonly well ſeeded. Sometimes, indeed, conſiderable quantities of ſeed are gathered from the firſt crop, on land where wheat is cut the ſame year: the ſtubble preventing the clover from growing too thick for producing ſeed. The

including the water or opening furrow, was made of light half inch plank, for the ſides, bottom, and partitions. It was ſeven feet long, five or ſix inches wide, that the ſeed lying thin may eaſily ſhift about and not preſs heavily on the outlet holes.* It was three inches deep, and divided

ſecond crop of graſs in good land is mowed ſo high as to cut off the heads of clover, and as little of the graſs as poſſible. A man in this manner will mow 2 or 3 acres a day. The time of mowing is when at leaſt one half of the heads become dried. It is raked immediately into *ſmall heaps* or cocks. In what manner ſoever collected, all ought to be put into ſuch heaps in the field, and there expoſed that the huſks may rot (about three weeks) or otherwiſe the ſeed will be got out with great difficulty. Attention is to be paid to the heaps, leſt they rot too much next to the ground. If much rain falls, the heaps are to be turned. When the heaps are ſufficiently rotted and dry, known by rubbing ſome heads in the hand, cart them into the barn; and afterwards thraſh out on the barn floor, and clean with a wire riddle. It was an extraordinary quantity of ſeed that I once knew produced, 1 buſhel and 4 quarts from $\frac{1}{4}$ of an acre; equal to $4\frac{1}{2}$ buſhels an acre."

* The 7 feet lands were preferred to $5\frac{1}{2}$ feet lands which had been before uſed (the farm a very level, ſtrong wheat ſoil). The clearing out or water furrows were included both in the 7 feet and the $5\frac{1}{2}$ feet lands. After

vided into ſeven parts, each diviſion or receptacle having two holes bored through the

making a number of inſtructive experiments on eleven acres; of wheat *harrowed* in and compared with wheat at the ſame time *plowed* in; of wheat ſown on a *broad level*, on round *ridges* of various heights, and on flat *beds* having deep parting furrows, the ridges and beds with their water furrows being 7 feet wide, and running ſome N. and S. others E. and W. I clearly preferred *beds* to ridges; becauſe it is immaterial in what direction they lie, the ſun ſhining equally on the whole horizontal ſurface of the beds; becauſe the ſoil being alike in quality on the whole of the *bed*, the wheat grew equally well from edge to edge; becauſe therefore, in reaping, the wheat was better ſaved, there not being ſhort wheat as on the edges of ridges; and becauſe the furrows being opened deep the greateſt rains preſently glided into the furrows and were by them conveyed into the main drains of this flat land, without ever drowning or ſcalding the growing wheat, or hardening the ground on the *beds*. Upon the *ridges* E. and W. the wheat on the north-ſide was inferior to that on the ſouth-ſide. This of the ridges raiſed ſomething higher than is common. On the higheſt ridges, which were in the extreme for a ſtrong contraſt, the wheat on the north-ſide was nearly all dead, in the ſpring. In *ridges* the beſt ſoil is heaped in the middle; and the thinner ſoil at the edges gave ſhort ſtraw and mean grain, much whereof was loſt in reaping and gathering. The *ridges* formed receptacles of rain which were angular at bottom, ſo that rain water roſe ſuddenly half way up the ſides of the *ridges*, and eventually hardened the ground

the bottom, half an inch diameter, and placed diagonally. The holes were ſinged with a hot iron rod to ſmooth them. Square pieces of ſtrong writing paper, (any gummed paper) were paſted over the holes, on the inſide of the box. A hole was burnt, with coarſe knitting needles, through each paper; and trials were made with ſeed gently ſhook in the box, over a floor or carpet; and the holes are enlarged as far as there may be occaſion for dropping a due quantity of ſeed. It was uſed for ſowing turnip ſeeds: the old papers being taken off, and new ones paſted on; and then holes burnt ſuitable to turnip ſeeds. At about a third of the diſtance from each end of the box were faſtened ſtrong leathern ſtraps;

on them, as well as drowned or ſcalded much of the growing wheat. On *ridges*, clover is more expoſed to froſts, winds, and waſhing of the earth away from the plants, than when on flat *beds*; nor is it ſo advantageouſly mowed. My *beds* were ſeparated by deep water furrows, formed by a double mould board plow dipt deep by the power of only two horſes, not large, and which had a good ſhare of the Engliſh race blood in them. This mixt breed bear heat well, are briſk, and willingly exert their powers.

ſtraps; by which the box was held, and a little agitated in carrying it before the ſeedſman, in a direction croſſing the beds, whilſt the ſeedſman walked along the beds.

The only comparative experiment made by me, of clover ſeed ſown with the box above deſcribed, againſt broad caſt ſowing, was thus: In the moment when a ſeedſman long uſed to ſow clover ſeed, was ſowing ſeed in the chaff at the rate of 12lb of clean ſeed, according to his eſtimation, clean ſeed was ſowed on ſeveral lands or ridges of growing wheat, with the box. After ſowing about 200 yards in length, the ſeed put into the box did not appear reduced in quantity, and I feared it was ſown too thin. But the growth from the box ſowing, proved to be thicker and much more equally diſtant than that from the broad caſt, and the plants were ſufficiently cloſe. Theſe operations left the ſeeds on the ground of the field of wheat without any means uſed to cover them. The time of ſowing was about the middle of March, whilſt

whilſt there were yet light froſts. It was a ſeaſon in which I often had clover ſeed ſown in the chaff, and left it uncovered, without ever experiencing any loſs or diſappointment.

When clean clover ſeeds are ſown on a clean ground and harrowed in, numbers are ſmothered under ſmall lumps of earth as well as under larger ones: not ſo of ſeed left on the ground uncovered *during the froſts*, in March rather than earlier. It therefore ſeems proper that much more than 4lb an acre ſhould be ſown, when the ſeeds are to be *covered*.*

*Wheat on Clover.*

The language of Engliſh farmers on this head is, that wheat on clover is to be ſown on "one earth"—one plowing. To conform

* Mr. E. is lately returned to America from a ſecond viſit to England, and is confirmed in his former opinion that clover is better in Pennſylvania than in England; merely, as he thinks, from the ſoil or the climate of America being more ſuitable to it. See page 33.

form to this idea, I conducted this buſineſs on 15 acres, in this manner:

1. The clover having been cut once and then paſtured, though not cloſe, was turned in deep by a plow.

2. The wheat was ſowed, broadcaſt.

3. The harrow followed twice, in the ſame direction in which the clover was plowed in.

4. The ſown wheat was then rolled.

The crop ſtood well and yielded ſatisfactorily. It grew near two miles from my other field wheat, on a ſoil not quite ſimilar; ſo that a juſt compariſon could not be made between them. The operations immediately followed each other, without any pauſe. The plow, the harrow, the ſeed, &c. were all ready on the ſpot, before the plow proceeded.*

Mr.

* Mr. *Macro's* experience is againſt this *immediate* ſowing upon plowing in the clover; and his experiments were *repeated*; mine a *ſingle* inſtance, which proved high-

Mr. *Young* was requeſted in Ireland, to inſtruct the farmers of that country in proper

ly ſatisfactory, *in general*, without any pointed *particulars* occurring of a much ſuperior produce. Mr. *Macro* gives the following encouraging detail of his practice and ſucceſs. " From upwards of 20 years experience," he ſays, " I am of opinion that, the beſt way of ſowing " clover lands with wheat, is to *plow the land* 10 *or* 14 " *days before you ſow it*, that the land may have ſome time " to get dry, and after rain enough to make it dreſs " well, lay on the ſeed in September, two buſhels an " acre; in October, three buſhels an acre; and in No- " vember, four buſhels an acre." Theſe quantities of ſeed are here mentioned from Mr. Macro, for the entertainment of farmers in America; who may wonder that difference of climate or ſoil, ſhould admit of ſuch difference in the quantities ſown: America, three pecks to a buſhel of ſeed:—England, two to four buſhels, an acre! The atmoſphere in America is dry in compariſon to that in England; the Engliſh atmoſphere abounds more in humidity than the American; and affords drink and with it *food to more plants* than the humidity of the air in America can beſtow. It ſeems, he plows in the clover on a fall of rain, and then waits for a due ſtate of the ground. " The furrows, he continues to ſay, ought not " to be more than 8 or 9 inches broad: leſs is better if the " plow turns them well; and the two laſt furrows ſhould " not be lapped one on to the other, but plowed ſo as to " leave a ſpace of near two inches between them, for " ſome ſeed to fall in. I am at a loſs, he ſays, to ac- " count for the *wheat thriving better on lands that have been*

per courſes of crops. In directing them how to ſow wheat on clover, he ſays; "The clover

"*plowed ſome time*, than it does on *freſh plowed* lands "which dreſs as well or better: but I have *often* tried "both ways on the ſame lands, and always found the "former anſwer beſt." 1 An. 109———Conjecture: the clover plants being buried, and the wheat ſown at the ſame time, they both ferment and run into heat in the ſame moment: the germ then ſhoots and the root is extremely delicate and tender for ſome days; during which the buried herbage obtains its higheſt degree of heat; which added to the internal heat of the germ may, though only ſlightly, check and a little injure the delicate ſhoot of the wheat. In ſprouting barley for making malt, a little *exceſs of heat* in the bed, checks, and a little more totally ſtops the ſprouting or growth of the roots. Both modes, give crops ſuperior to what are produced from wheat ſowed on fallow. Farmers may well try both methods, for determining which to prefer; that is, as well in the *immediate* ſowing, on plowing in the clover, as in the method of ſowing not till 10 to 14 days after having plowed in the clover: ſuppoſe an half in each way. Both modes are excellent. In letting the ſoil reſt 10 to 14 days an opening is given to heavy rains conſolidating and leaving it in an inferior ſtate for receiving the wheat ſeed. If rain falls after burying the clover, and before ſowing the wheat, it may ſometimes be neceſſary to wait for the ground becoming only moiſt, rather than ſow when it is wet and heavy. If the farmer plows in the clover when the ground is *dry*, he may then chooſe to wait for rain before he ſows.

clover is to be well plowed in, with an even, regular furrow; and the wheat ſown and harrowed well."

One

Though for this reaſon *alone*, he need not wait. I have found it generally ſafe to ſow during a drought, when the ſoil is very dry: but not when a light rain has fallen on the very dry ground. In the former caſe the ſeed is ſafe till a rain falls, which is uſually in plenty after a drought: the ſeed now quickly grows up: but in the other caſe it is ſlightly damped, and it ſwells; but the moiſture is ſo ſoon and totally evaporated as to leave the ſeed to dry-rot and periſh. There may have been ſome peculiarity in Mr. Macro's ſoil: but it probably was but a light ſoil, little liable to be hardened in 10 to 14 days; as ſtrong wheat land would.———Of all the modes of ſowing wheat, I am ſtrongly perſuaded that in *cluſters* it gives the beſt crops. A number of experiments made by me are the foundation of this opinion. Theſe experiments were made at Wye in Maryland. There I invented a ſimple ſtrong machine (on leaving my farm it was given to Major Roſs) which dropt 5 or 6 grains of wheat in each cluſter on above 8 acres. The cluſters were 7 inches apart in the rows; and the rows were about 9 inches from each other. A horſe on each ſide of a bed walked in the water furrows and ſowed an entire bed in 8 rows at a time. A light pole extended between the horſes, from the neck of one to that of the other. Accounts of ſome of the experiments were publiſhed in the Columbian Magazine: and it appeared from them that as far as 9 grains in a cluſter, (being no further

One of my neighbours intending to ſow wheat on clover, plowed up the clover a week

tried by me) and from Mr. *Singleton's* experiments, made at the ſame time in Talbot, as far as 15 grains in each cluſter, the produce in wheat was progreſſively the better. At that time I had never tried wheat ſown on clover plowed in: but the machine was perfectly adapted to cluſtering wheat on ground in that ſtate. The following mode of ſowing and cultivating wheat and clover may be introduced. Clover is to be plowed in deep and the furrow neatly turned. On this is drawn by a horſe walking in the water furrow on each ſide the bed, a machine which ſhould open the ground about two inches deep in rows 8 inches apart, and in the rows drop cluſters of ſeed wheat, each conſiſting of 8 or 10 grains, at 6 inches apart, equal to about a buſhel to an acre. The whole bed is finiſhed in the horſes walking once through the furrows. In November, a ſhim of ſeveral blades or hoes 6 or 7 inches wide, and fixed in a frame ſhould cut the ground between the 8 inch intervals of ground; which, cutting up the weeds and ſtirring the ground, would leave it in good condition till March or early April; when the ſhim ſhould again clean and ſtir the ground; and at the ſame time with the clover ſeed box and ſeed on the frame of the ſhim, by jogging the box, the clover ſeed would be ſowed, immediately after the ſhim. This alſo is performed by the horſes walking in and being confined preciſely by the water furrows. A light harrow or rake may be attached to it. In cluſtering wheat endeavour to drop the ſeeds all in a heap, in contact with each other if it can be. They thus proved greatly ſuperior, dropt in

week or two before ſeeding time; and then gave it *a ſecond* plowing, acroſs, and ſowed wheat on it: whether the wheat was plowed or harrowed in, I know not.* Vaſt numbers of roots of the clover were turned up, and left ſtanding erect above ground, all over the field. Here was unneceſſary



ſmall holes made by a dibble, to the ſame number of grains ſpread within circles of three inches, the centres whereof were 7 inches from the centres of other like cluſters; when the dibbled holes were only 6 inches apart. Beſides ſowing clover ſeed in the moment of ſhimming, gypſum, lime, or rotten dung, may alſo be diſperſed as the machine proceeds in ſhimming, thus: In 7 fields the rotation conſiſts of,

| | | |
|---|---|---|
| 1 Roots, the ground dunged beforehand. | | |
| 1 Spring grain; in ſowing it, ſtrew on each acre, lime 12 buſh. | | gypſum 1 buſh. |
| 1 Clover | | |
| 1 Wheat | 12 | 1 |
| 1 Clover | | |
| 1 Rye or Barley | 12 | 1 |
| 1 Clover or Pulſe | | |
| 7 Fields | | |

* Had not this been plowed a *ſecond time*, it would have been preciſely in Mr. Macro's method: but the ſecond plowing overſat the good work.

labour, an uſeleſs and even injurious plowing, by which the manure from thoſe ſubſtantial roots and a part of the green herbage, was loſt to the crop of wheat.

Another neighbour proceeded thus, in ſowing *wheat on clover*:

1. Plowed in the clover, *deep*.
2. Harrowed.
3. Rolled.
4. Sowed wheat.
5. Plowed it in, *ſhallow*.
6. Harrowed it, in the ſame direction.*

BEANS.

* Whilſt the former copy of this was at preſs, an account of the effect of this experiment was expected from the experimenter; but I was obliged to ſpeak of it from memory, which proved to be incorrect, and that part is now omitted. Mr. *Singleton*, of Talbot, walking in his wheat field, was ſurpriſed to find the wheat much ſuperior on the meaner ſoil of the field; it being higher with ſtronger ſtraw and larger heads. This part of the field had been in clover, which was twice mowed, and in Auguſt broke up, and ſowed with the wheat the firſt of September. The other part had the clover plowed up in March, for tobacco: but tobacco being laid aſide, this ground was then repeatedly plowed in the ſummer as a fallow, and

## BEANS.

Let not the novelty or labour of ſowing beans in field huſbandry be made a difficulty to the application of them in a rotation of crops. They may be dropt by hand. But a ſimple and cheap machine may be made for dropping them in cluſters, as quick as a horſe drawing it can walk. Two wheels made of inch plank doubled, turn an axis of about 5 inches diameter, having notches on one line round it, from each of which 3 or 4 beans are diſcharged at the ſame moment into a furrow opened by a plowſhare or wooden coulter, the ground being firſt well prepared. A ſtave at the tail of the machine may ſerve to cover the beans, if occaſion; though the ground, being mellow, always tumbled

ſown alſo the firſt of the ſame September, with wheat: from which it yielded 14½ buſhels an acre; when the part twice mown and but once plowed gave 24½ buſhels an acre. The difference is great: to which add the value of the clover crops and the ſaving of plowings. They abundantly prove the ſuperiority of wheat *on one earth*. Mr. Singleton is to be depended on, and keeps a diary of his farming buſineſs.

tumbled in on the beans, with me. If the wheels be two feet diameter, they will have a circumference of 75 inches, which divided by $10\frac{1}{2}$ inches, give 7 for the number of notches round the axis, for dropping the beans, in cluſters, $10\frac{1}{2}$ inches apart in the rows. With ſuch an inſtrument beans were drilled for me, at Wye.

## *New Practices in the Culture of Maize and Wheat.*

The common modes of cultivating the various corns, are every where familiar: but the following practices and obſervations are upon new modes, or particular branches of the buſineſs.

In Maryland, moſt of the wheat ſown is amongſt maize, whilſt it is ripening in September. The farmer is urged to ſow wheat early, for avoiding damage from *ruſt*, and from *ſtorms*. A ſtorm, upon maize having the tops on, would proſtrate or entangle the tall ſtalks, ſo as to render plowing

ing in the ſeed wheat difficult and leſs perfect; and he dares not cut off the tops till after the wheat is ſown and covered; becauſe in plowing in the ſeed, the ſwingle-trees catching and bending down the ſtalks, and then ſuddenly letting them go with a ſpring, throw off the ears of corn with ſome force; which with the tops and taſſels on would be conſiderably reſiſted. Another miſchief is common, as well from horſehoing the maize as plowing in the wheat, which is that the roots are torn or cut by the plowſhare.

For *avoiding the above mentioned miſchiefs*, and that the ſeed wheat ſhould be *covered ſolely by plows*; and alſo that the wheat ſhould grow on perfectly *flat beds*, and the plowſhares work partly above the mat of fibrous roots of the maize, I introduced the following practices in my maize and wheat culture, which was on very large fields.

Obſerving much irregularity in the ſtanding of maize in the rows, which prevented plows

plows from working ſufficiently near to the plants for covering the ſeed wheat, and that much was left for the expenſive and often bad work of handhoes to perform, I cauſed the maize ſeed, after liſting and croſſing, to be carefully placed *cloſe* to the *landſide* of the furrows: not dropt in the careleſs ſcattering manner uſual. The maize thus grew very ſtraight in lines, and admitted the plows to paſs near the plants. Theſe being up and a little grown, the deſign was formed of directing the firſt or finger-like roots to dip deeper than common before the lateral roots ſhould ſtrike out. The ſoil was plowed full five inches deep; and turned at firſt *from* the maize, on both ſides of the plants: but they being then very young, it was neceſſary to leave more ſhoulder or bed to them than was deſired, to avoid burying them with the earth falling back: therefore the plow, on having worked through the field, immediately returned to the place where it began to plow from the plants, and it now took off as much more earth, ſtill turning it *from* them, on each ſide,

ſide, as they could well bear without danger of their tottering. All now *reſted* 10 or 12 days, even in the drieſt weather, with intention that the lateral roots ſhould take their direction under the *artificial ſurface* of the ground formed by the plow-ſhare. The plows next turned a furrow, on each ſide of the rows, *to* the plants, through the whole field; and then plowed through the balks or whole of the intervals not before plowed or horſehoed. The hand-hoes performed as uſual, except that hilling was wholly forbidden. Soon as plowing through the intervals was finiſhed, the plows again plowed *from* the plants: and ſo repeatedly continued to plow through the intervals alternately *from* and *to* the rows and plants; whereby another important purpoſe was anſwered: the keeping the whole field *level*, for growing the wheat on *flat beds*, and avoiding *ridges* or beds at all *rounded*. The alternate plowings *from* and *to* were continued even during the forming and filling of the grain, as far as was requiſite for keeping the ground *clean and ſtirred* to receive

ceive the ſeed wheat; and it was a continual work to the plows, in which the plowſhares paſſed rather over the roots which ſpread and ran deeper than if they had taken their firſt ſtart under the common ſurface of the earth, and therefore they were not torn up, or the plants fired or checked in their growth. Thus at the time of ſowing wheat the ground was ſo perfectly clean, fine and light, that for ſeveral years ſucceſſively, *half a buſhel* of wheat ſufficed for ſeed to an acre. This thin ſowing made ſome talk, and a neighbour came to ſee the ſeedſmen at work. He examined them ſeparately, they were two; then meaſured the diſtance of the maize plants from each other; ſaw a portion of the ſeed meaſured and ſowed; then counted the cluſters of plants that the portion of ſeed extended to when ſown; and he ſeemed ſatisfied. He was not a wordy man, and I aſked no queſtions. Great advantages were obtained in cutting off the maize tops before ſowing the wheat; which in common would be improper, where wheat is to be ſowed on maize.

maize. That the ſwingle-trees might not hang on the maize-ſtalks, the rope traces were half buried in a groove cut in the ends of the ſwingle-trees, by which the corn ſtalks never were caught, but gently glided off.

Light one horſe plows covered the ſeed wheat cloſe to the rows of maize, without any want of handhoes: but a rake followed and levelled the ridge, here and there formed by the one horſe plows lapping the oppoſing furrows which they ought not. For chopping round ſtumps, a handhoe was uſed. The light plows went only a bout or two, next to the maize plants: then followed the two horſe plows, for covering the reſt of the ſeed; and theſe left a narrow balk, which the double mould board plow ſplit. This was pleaſingly performed: the double mould board plow, dipping deep, ſhouldered up the earth on each ſide and gave ſquare edges to the *beds*, leaving them with flat ſurfaces, and deep furrows

as

as drains for receiving heavy rains as they fall and gently glide off the beds.*

My Maize was planted four feet apart in the rows, with ſeven feet intervals between the rows; which gave *beds* of wheat, after deducting the water furrows, full $5\frac{1}{2}$ feet wide. Concerning *beds* and *water furrows*, ſee before, page 102. The maize ſo planted in ſquares of 4 by 7 feet, takes 28 ſquare feet to each cluſter of maize plants, commonly called hills of corn, but which in the above method of culture has no hill; and there are 1550 of them on an acre. By a ſingle dip of the double mould board plow and progreſſing along, the edges of the wheat beds are formed and finiſhed, the water furrow is left deep and clean for receiving from the flat beds and carrying off redundant rain, and for conveying as funnels freſh nouriſhing air to the growing wheat

* The one horſe plows might have performed the whole; except opening and finiſhing the water furrows and edging up the ſides of the beds, which no plow elſe than the double mould board plow, could well perform.

wheat in the ſpring till the grain is ripe: and when ſhimming the wheat in autumn and ſpring is practiſed, the water furrows will be as paths to the horſes; which aſſure preciſion in the work.

In October, the wheat plants being up, with ſharpened hoes the maize plants were chopt off cloſe to the ground, without injuring the wheat, even although a plant of wheat was here and there cut up. Two of the people take a row between them; and bear off the corn and ſtalks to the headlands at the ends of the rows: one perſon carries to one end and the other to the other end. There on the headlands the ſtalks and all were ſet up in conical heaps, with the buts on the ground. They remained thus, airy, in not too large heaps, till the corn was cured; and then the ears with huſks on were ſeparated from the ſtalks and carted to the fodder houſe, or hollow rick, made from the maize tops, which were early cut for avoiding impreſſions from equinoctial ſtorms. The naked ſtalks were carted

carted to the farm-yard, for litter, at leiſure; the blades having been ſtripped off in the field, before chopping off the ſtalks.

In making experiments, it is well to have ſome variety, progreſſing from ſmaller deviations into extremes: by which the beſt medium is to be aſcertained, and the utmoſt that the plants can bear is diſcovered. I had tried tops of maize cut off, ſoon as the taſſels and ears had ſhot out; and thought the grain rather better for it. I had alſo expoſed infant plants eight to ten or twelve days, to drought and ſcorching ſun, ſtanding on parched narrow ridges, and then continually plowed the ground to and from the plants, even whilſt they were in ears and grain filling, without any injury to the corn. Now it was determined to try the effect of plowing ſo cloſe to the young maize plants as to rub the plowſhare along the maſs of roots, turning the earth *from* them, on both ſides, and let them ſtand expoſed to the ſun and wind ſome days. It was in a very heavy ſtrong piece of ground

ground which the horſes, ſtraddling the rows, plowed thus and turned the earth from the plants, on both ſides, ſo that the plants about five inches high, generally tottered, and a few were plowed up. They ſtood ſo eight days in very hot, dry weather. The earth was then plowed *to* them: and from and to them, alternately juſt as the reſt of the field, from this period. This was of four rows. When near five feet high, ſhewing the field to a neighbour, I aſked if he perceived any difference between the firſt four rows (the above mentioned) and the reſt of the maize in that cut, which was a ſmall one. He pauſed, but concluded that if there was any difference, the four rows were rather the beſt. To me there appeared no difference. The whole had been plowed from and to the plants, but not ſo cloſe as the four rows.

At other times I had ſtripped blades bolder than common: and now about 150 hills of maize were pitched on for ſtripping the blades and cutting off the tops at a time when

when the corn was not hard, but here and there might be ſome nearly ſoft enough for roaſting ears. Injury was apprehended from this ſeverity: but the value of ſo few hills of corn was diſregarded, when it was ſought to know how far the maize would bear ſevere treatment. Beyond expectation, no difference was obſerved between this and the reſt of the maize.

## HEMP.

The extenſive uſefulneſs of hemp, the little interference of its culture with the other work of farmers in America; and *when water-rotted*, the eaſe with which it is prepared for *rope*, as well as the general certainty of the crop with a good price, led me to admire it in preference to other uncommon articles of crop.*

Ground,

* My hemp harveſts at Wye in Maryland, were always after thoſe of wheat, and before ſeeding winter grain. In England they interfere with the grain harveſts. Between water-rotting, *daily as it is pulled*, and the ſpreading it in fields to rot, is all the difference in the world: the former is diſpatched in a few days: the latter requires

Ground, level and rather low, not wet, a mellow *loam*, whether of the ſandy or clayey ſorts, was preferred. Theſe ſoils are not cold; and when well cleaned and prepared by plowings and a due quantity of manure, are in condition to yield *many repeated crops* of hemp; a little manure being now and then added.†

Farmers without experience, if not alſo without thought on the ſubject, ſay their lands will not bring hemp. Moſt kinds of ſoil will yield good crops of it, if not wet. If poor, manure them. Every huſbandman can manure and cultivate land enough for giving him rich crops of hemp. The plow-

careful turning once or twice a week, for a number of weeks; and then is found ſtraggling or tangled: but with attention it is gathered up and the ſtems are placed in order. In America, hemp and flax are commonly *dry* before they are ſpread to be dew-rotted. If ſpread before the laſt of September, they become ſun-burnt, red, harſh, and dead.

† Mr. Young ſpeaks of a piece of ground at Hoxne in Suffolk, England, which has been under crops of hemp for *ſeventy ſucceſſive years*.

plowings for reducing ground to a mellow garden-like ſtate ſhould be many, preceding the *firſt* ſowing. Every time that young weeds appear, plow them in. When the ground is thus well cleared of the ſeeds of weeds, then ſow hemp-ſeed, and repeat it year after year on the ſame ground; giving it now and then a little manure and *two autumnal plowings;* and the like plowings with harrowings in the next ſpring, immediately before ſowing. If to cultivate an acre thus highly ſhould deter the farmer, let him at firſt try a fourth of it; which would give him more than he would want of traces, leading lines and other rope. The ſpinning and working it up into rope would be mere play: but, as is ſeen below, making as much hemp as he can for market, would yield him a good income.*

April,

* The tobacco planter thinks nothing of cultivating twenty acres in tobacco, and erecting four or five large framed houſes for curing it. But he would ſtart at a propoſal that inſtead of tobacco he ſhould cultivate the 20 acres in hemp, although it would require but one ſuch houſe, not an eighth of the labour and attentions,

April,† when the ground is moiſt, clean and mellow, in garden-like condition from plowings and harrowings, is the time for ſowing and lightly harrowing in hemp ſeed. The plants then ſoon appear, and rapidly cover and ſhelter the whole ſurface of the ground; whereby weeds are kept under, and immoderate exhalation is prevented. My hemp never ſuffered materially from drought but once, and that of a ſowing in May. It was never found neceſſary to weed what was ſown for a crop; but only ſuch as was ſown thin for producing ſeed. Sometimes ſeed was ſaved from the margin of the field, where the plants had room to branch, and were coarſe.

When the male or impregnating plants ſhewed maturity by ſome change in the colour, and by the farina or duſt flying off



and is without any of the uncertainty. It is a common miſtake that hemp requires low ground or rich bottom land. Almoſt any land that is not wet, may be made to yield good crops.

† The middle to the end of April.

from the bloſſoms, all was pulled up, both male and female: and the pulling of every day was put into a ſalt water cove, in the evening of the ſame day, promiſcuouſly bound up in ſmall bundles, and ſunk $4\frac{1}{2}$ feet in the water, in a thick ſquare bed. On the third day it was inſpected; and from the third to the fifth it was enough rotted, as it is called. In examining it, with finger and thumb ſome of the roots were broke. If they bent or were tough, it was not enough: when they ſnapt off ſhort like glaſs, it was enough: but the bark alſo was tried. The hemp was then taken out of the water, and laid ſloping with the heads down to drain till morning: for it was uſually taken out in the evening. In the morning it was ſpread, and whilſt drying, once turned. In a few fair days it was dry, and then carted to an old tobacco houſe, where it was bulked up till the hurry of ſecuring the other crops was over. It was broke and ſwingled in the next winter. Some of it was made into ropes for my farms: the reſt ſold to rope-makers, from the

the ſwingle. The rope was bright and ſtrong, and the hemp ſaid to be of a quality entitling it to the bounty then offered for *water-rotted* hemp.

A ſmall part of one of my crops of hemp was *dew* rotted: which was ſufficiently diſguſting to forbid a repetition of that mode. It was a tedious while on the ground. Winds blew it about and entangled it. It rotted partially: not the whole of the ſame fibre alike. Here it was ſtrong: there weak.

Where there is only a ſtream of water, it might be proper not to place the hemp *in* the ſtream; but, digging a deep oblong receptacle, let a ſufficiency of the ſtream paſs through it, when full, on one ſide of the natural current. There rot the hemp in clean water; which ſhould conſtantly be coming into and paſſing through the pit, in a degree of plenty for preſerving the water

from corrupting or being ſtagnant; but not ſo rapidly as to fret off its bark.*

After

* The operation called *rotting* of hemp, ought to avoid every tendency to *rot* or *ferment* the plant. Water when pure and lively does not *rot*, but it *diſſolves* a viſcous gummy ſubſtance which had bound the fibres of the bark together and to the body of the plant. The pureſt water is the beſt *diſſolvent* of ſuch viſcous ſubſtances. I have ſeen hemp which had been rotted in ſtagnant dirty water; the appearance whereof was bad. The hemp I rotted in clear tide-water, had a light ſtraw colour. I ſee no reaſon for apprehending damage to the bark or firm part of the hemp, if it remains in the *running or live water* a week after it is proved to be enough ſoaked for breaking and dreſſing. It probably would be freer from the gummy matter, and would break and hackle much eaſier and better, without being at all weakened. But, let *experiment* be made! When the bed of hemp in clean *live water* is enough, let a part remain in the water a day or two longer; another part two or three days, &c. that we may ſee the effect of its being continued in the water till different periods after its bark is commonly enough for being ſtripped. The water muſt be *alive*, not ſtagnant. Experiments carried on progreſſively till in the extreme, have their uſe.

A Mr. *Antil* ſays, if hemp is put into *ſtagnant* water, it will be enough in four or five days: if in *running* water, in three or four days: which ſtrongly implies the ſuperior diſſolving power of live water, and that the operation effects *ſolution, not rottenneſs*.

After pulling the hemp, weeds grew up; which were reduced, and the ground was left in clean condition till the ſpring, by plowings.

Having no minute of the quantity of ſeed ſown, I can only recommend what ſeems beſt. But, it greatly depends on the ſtate of the ground, and the purpoſes for which the crop is intended. A little experience will aſcertain the proper quantity. Two buſhels of ſeed to an acre, I believe are a full portion for rope. A little leſs might be about the quantity I ſowed. It is ſaid in a publication by the Boſton Committee of Agriculture, that in the common method of ſowing by broad caſt, " not leſs than three buſhels are uſually ſowed, and ſometimes more, according to the richneſs of the ſoil." They ſow a great deal in New England for making *linens*, eſpecially *ſail-cloth*, as well as for *ropes*.

A deſign was formed by way of experiment, but not put in practice, of ſowing the

the hemp ſeed on flat beds, having paths between them from whence the hemp plants might be pulled, half way acroſs the bed, and then the other half; with intention that the male hemp ſhould be pulled and water-rotted alone, leaving the female hemp to ſtand longer, which its deep green colour and thriving appearances ſeemed to recommend; but why ſhould this double work be impoſed, when the crop which had been *all pulled at once*, ſoon as the male plants ſhewed ripeneſs, proved ſo excellent and ſo unexceptionable?

The plants of one crop, which grew too thinly, were ſo firmly fixed, that it was found neceſſary to cut them off near the ground; which left their numerous ſnags ſtanding: and they were dangerous to ſuch beaſts as might any how get into the ground; and to people walking there, eſpecially in the dark.

If the ground be good and well prepared, no crop is more certain than hemp, ſowed in time, and when the ſoil is moiſt. But, how

how uncertain is the tobacco crop! Failure of plants from froſt, drought, or fly; want of ſeaſonable weather for planting; deſtruction by the ground-worm, web-worm, horn-worm; buttening low, for want of rain; curling or frenching, from too much rain; houſe-burning or funking whilſt curing; froſt before houſed; heating in bulk or in the hogſhead; inſpection, culling, &c. Cultivating tobacco cleans, but expoſes ſoil to exhalation and waſhing away. It is only about a month that it ſhelters the ground: but hemp ſhades it from May till about the firſt of Auguſt: and from early Auguſt it would be advantageouſly ſheltered with a growth of buckwheat, till this bloſſoms; and then during a temperate ſtate of heat, it is plowed in as a manure.

This *buckwheat manure* repeated every fall, would I believe preſerve the ſoil in good heart for yielding rich crops of hemp, that are not ſuffered to go to ſeed, during many ſucceſſive years. *Plants ſuffered to go to ſeed*, remarkably impoveriſh ſoil. Not

Not ſo of what are harveſted *before they are in ſeed.* Hemp is pulled before it ſeeds: flax whilſt in full ſeed. The effects on the ſoil are accordingly. But if the male Hemp is pulled by the beginning of Auguſt and the female not till September, the ſeed being then ripened, the ſoil is thereby greatly impoveriſhed; and two hemp harveſts are produced inſtead of one: the laſt whereof interferes with ſeeding of wheat, rye, and barley.

Buckwheat muſt not run to *ſeed* on ground to be ſown with hemp. I have had it ſpiring up and contending with growing hemp, till the buck has been five feet high.

The heavieſt work in procuring Hemp, is the *breaking* and ſcutching or ſwingling it. But as it is the work of leiſure winter, and every perſon who ſtrips tobacco can break and ſwingle hemp: and moreover as hirelings, if neceſſary, are in that ſeaſon eaſily obtained, this bugbear part of the buſineſs

buſineſs can aſſuredly be accompliſhed, and the hemp got rid of at market in the ſpring.

A planter gaining 20 hogſheads of tobacco from 20 acres of ground, value 800 dollars, might expect 12000 or 16000lbs. of hemp from the ſame ground, value 1000 or 1200 dollars. But, if the income from the hemp ſhould be a fourth leſs than from the tobacco crop, yet I would, on ſeveral accounts, prefer the hemp culture.

For the country houſe-wife who wiſhes for information, the following is inſerted as what I have read of a method of *ſoftening* and *preparing* hemp, for making it into linen. The Hemp is laid at full length in a kettle. If the kettle is too ſmall to admit it at full length, the hemp may be doubled, but without twiſting it; only the ſmall end of every hand is twiſted a little, to keep the hands whole, and from tangling. Smooth ſticks are laid in the bottom of the kettle, acroſs and acroſs three or four layers, according to the ſize and depth of the kettle; which

which is for keeping the hemp from touching the liquor. Then pour lye of middling ſtrength, half the ſtrength of that for ſoap, gently into the kettle till it riſes nearly to the tops of the ſticks. The hemp is then laid in, layer croſſing layer, ſo that the ſteam may paſs through the whole body of the hemp. The kettle is now covered cloſe as can be, and hung over a very *gentle* fire to ſtew or ſimmer, but not boil, ſo as to raiſe a good ſteam for 6 or 8 hours. It is then taken off, and let ſtand *covered* till the hemp is cool enough to be handled. It is now taken out, and wrung very *carefully*, till dry as can be: then hang it up *out of the way of the wind*, in a garret or barn with all the doors ſhut. Here it remains, now and then turning it, till perfectly dry. Then pack it up in a *cloſe*, dry place, till it is to be uſed. Yet at times it is to be viſited, and examined if any part has become *damp*. At leiſure, *twiſt up* as many hands of hemp as are intended for preſent uſe, *hard* as you can; and with a ſmart, round, ſmooth hand-beetle, on a ſmooth ſtone

ſtone beat and pound each hand by itſelf, all over very well, turning it round till all is well bruiſed. Then untwiſt and hackle it through a coarſe, and after it through a fine hackle. Hackling is performed in the ſame manner as if combing a fine head of hair; beginning at the *ends* below as theſe are entangled, riſing higher and higher: at laſt the top of the head is reached. The firſt tow makes country rope; the ſecond, oſnaburgs, ſheeting and bagging; and the pure hemp excellent linen.

## FARM-YARD MANURE.

For conducting the buſineſs of a farm to full advantage, the farmer is to purſue objects which ſyſtematically embrace ſuch a regular courſe of particulars as ſhall beſt follow and depend on each other, for obtaining the one whole of the deſign of farming. It is not immediate product alone that we aim at: for, whilſt we wiſh to obtain repeated full crops, our reaſon aſſures us it is indiſpenſably neceſſary to that end, that the

ſoil

ſoil be preſerved in full vigor. The mind then is employed, principally, on the objects of preſervation and improvement of the productive powers of the earth. Obſervations on the ſtate of common farming fix the opinion, that no unconnected random purſuits tend to enſure a ſucceſſion of advantageous huſbandry for any length of time.

Well choſen rotations of crops together with due culture, are believed to be ſo favourable to the ground as to need but little of manure in compariſon of what the common random or ill choſen crops abſolutely require. Still the ſteady and attentive application of manures, is held to be an eſſential duty in farming, a great link of the chain, in every inſtance. If rich ſoils require, comparatively, but a moderate quantity, in a rotation where ameliorating crops are prevalent, yet middling and poor ſoils want all that can be obtained; and, under the *old Maryland courſes eſpecially*, all ſoils eagerly demand *more manure than can be procured.* Theſe exhauſting courſes we

we ſee continually impoveriſh the ſoil. Too many farmers therefore incline to move to freſh lands; where they would preciſely act the ſame murderous part over again.

The principal links in good farming are due *tillage*, proper *rotations of crops*, which are treated of above, and *manures*, of which it is wiſhed the occaſion would admit of more than the few obſervations which follow.

"In the American practice, *hay and fodder are ſtacked in the fields;* and the cattle are *fed round the ſtacks and fodder-houſes:* the diſadvantages whereof are,

1. A *waſteful* uſe of the provender;

2. The *dung* lying *as it is dropped* without *ſtraw*, or other vegetable ſubſtance brought to it, the manure is little in quantity; and

3. That

3. That little *not lying in heaps*, is reduced abundantly by *exhalation* and *rain*; without leaving any thing to the ſoil.

In the Engliſh and Flemiſh practice (feebly obſerved by a few of our huſbandmen) cattle are carefully *houſed*, or otherwiſe confined to a fold yard in which are *ſhelters* againſt cold rains, during the whole winter, and as far through the ſpring as food will laſt: the advantages of which are,

1. A fair expenditure of the provender, *without waſte:*

2. *Leſs exhauſtion* of the juices; becauſe of the dung lying together, in *large heaps:*

3. The dung being mixed with the *ſtraw*, and other vegetable ſubſtances brought to the beaſts as *litter*, the whole is trod together, and forms a large quantity of very valuable manure.

It may be no exaggeration to affirm, that the *difference* in the quantities of manures obtained from an equal ſtock of cattle by thoſe ſeveral methods, may be as three to one. If ſix acres may be annually manured by the inferior method, then may eighteen by the ſuperior. Now on a ſuppoſition that *manured land is kept in heart five years* without repeating, in the one caſe but thirty acres will always remain in good order; in the other ninety acres: a very important difference! Indeed it is all the difference between an huſbandman's poverty and his riches."*

Do cattle, when foddered round hay-ſtacks and fodder-houſes or ricks, give twelve loads of manure each? Do they yield *one* ſuch load? It is a fact ſtated I think by Mr. Young, that in the courſe of a winter cattle have yielded full twelve ſuch loads, each beaſt; and if ſoiled or fed well during

* The above quoted paſſage is from a friend, who wiſhed to have ſomething ſaid of *farm yard manure*; and in very few words he has ſaid a great deal.

during the ſummer with cut green graſs or clover, they may be expected to yield more and richer manure; provided that they are *kept up*, on a *full quantity of litter*. Here, by the way, it may be noted that a portion of graſs only ſufficient to keep one beaſt in *paſturing*, has ſufficed five in *ſoiling*: and what is of immenſe importance to the ſtate of the ground and of future crops, the ground being *untrod*, in ſoiling, is left *light* and *mellow*. Another favourable circumſtance attends ſoiling: the beaſts are kept in *ſhade*, and conſiderably protected from flies; eſpecially when the houſe is kept dark during the heat of the day, with only airholes near the ground and above their heads.†

It

† In towns, *waſh* is given to cows; and in the country *ſwill* to ſows, &c. Waſh is compoſed of the waſhing of diſhes, and the offal of roots and cabbage from kitchens. Swill is meal, or rye or buckwheat ſoaked in water till the grains ſwell, and with ſtirring burſt; and ſometimes maize is ſo ſoaked. Swill is ſaid to be the moſt nouriſhing when ſoured by long ſtanding. The celebrated Count Rumford ſays it is coming faſt into uſe in Germany to keep horned cattle confined in ſtables, *all the year round*, and there feed and frequently give them a *drank*, compoſed of bran, grains, maſhed potatoes, maſhed

It will be ſaid, the ground round the ſtacks receives the dung dropt, as a dreſſing



turnips, or oat meal, rye meal, or barley meal, with a *large proportion of water* and a good quantity of ſalt: and it is diſcovered to be the moſt nouriſhing when given *warm*, and when the mixture has been well *boiled*. Another advantageous practice, the Count ſays, is to give one-third of *cut ſtraw*, mixt with two-thirds of chopt *green clover*; with which horned cattle ruminate (chew the cud) better than with green clover alone. Coach horſes are kept up in ſtables, many of them ſcarcely ever being permitted to run out on graſs. My coach horſes for above ſeven years paſt have never been a moment at paſture, but in all that time have been kept in ſtables, and fed on nothing but hay and oats, and now and then a little bran and ſhorts or maize; obſerving withal to give them *ſalt frequently*. Their health and plight have conſtantly been good in the whole of that time. Then why need farmers ſuffer their beaſts to tread, harden and untill their ſoil, and waſte graſs and dung, by running in paſtures, inſtead of being kept up, houſed and fed during ſummer with cut green *clover and ſtraw*, and in winter with *fodder and drank*. If no beaſts were ever ſuffered to paſture, there then ſcarcely would be any neceſſity for having croſs fences—What a ſaving of labour and wood! But what is to be done with ſheep? Give them a range of woodland and rough grounds? Why not keep them up? Mr. Bakewell practiſed ſtall-feeding them, if he did not alſo keep ſome in houſes the year round. They would require airy ſhelters and roomy yards, in diviſions, for the different conditions of ſheep. In Italy are ſheep-

to ſo much of the field. Alas! we know this extends to a very ſmall diſtance, and the

houſes built of ſtone in rows, with diviſions, a variety. Before them is a large ſquare *incloſure*, divided into *five equal parts*. In the firſt diviſion and in the ſtalls belonging to them, are the *ewes big with young*; in the ſecond *ſucking lambs*; in the third and fourth, the *two year old lambs*; and in the fifth are the *lambs done ſucking*. Trav. through Naples, tranſlated by Aufrere, 1789. In Flanders their ſheep are *always* in ſtables, and are let out every day into the yard. 20 An. 466.—Mr. Cook (inventor of the drill) ſays that the benefits from *ſtraw cut into chaff*, and paſſing through cattle, *inſtead of being trod under foot as litter*, are very great. He ſupported in winter, 40 cattle near 7 months on 30 acres of *ſtraw*; and 4 of turnips; and made from it 400 tuns of dung—10 tuns each beaſt. When he wrote this he was making experiments in feeding his *horſes* on *green* food, clover, vetches and graſs *cut with ſtraw*; and expected the dung from it will more than pay for all their keep and the expenſe of cutting. 28 Eng. Rev. 1796, p. 89. "It has ſay the reviewers, long been uſed in Germany to *chop green clover*, and mix it with *chopt ſtraw*: two ſtone (28lb) of clover, and one (14lb) of ſtraw. It is practiſed by thoſe chiefly who confine horned cattle in ſtables, *the year round*; feeding with *theſe* in ſummer, *drank* in winter."—Sheds with large boilers are fitted to ſtables and cow-houſes, to prepare food for horſes and cattle. Engliſh farmers ſay they find it highly advantageous. The *dranks* being *boiled* are more nouriſhing and wholeſome. Fuel and attendance are compenſated by improvement

the effect is in no part conſiderable. The place where, is ſome eminence: the rains



of the food. They boil potatoes two or three hours; the longer the more the food is improved. But of late *ſteaming*, inſtead of boiling potatoes, is preferred, for ſaving fuel. They throw away the water, as it is apprehended there is ſomething noxious to animals in *raw potatoes*, and in *potatoe-water*.——In Japan they univerſally feed all beaſts in *houſes*; in which they are kept up the year through. They ſeem to know nothing of paſturing. —" I took the idea of maintaining cattle in *yards or houſes*, ſays Mr. Baker, from having frequently heard that, in *Flanders*, they ſcarcely ever ſuffer their cattle to *paſture* at large: but the farmers all feed them in *houſes*. I have now purſued it three or four years; and have ſo much reaſon to be ſatisfied with it, that I cannot ſufficiently recommend it to others." 1 An. 93.——In ſoiling there is ſometimes a waſting of the green food, by giving *more than is eaten*; laying it in *heaps*; where it remains till it ferments and becomes ſour, &c.—By ſoiling *in a yard* littered, with the food in racks and cribs, labour in cleaning, and ſaving urine, is leſſened. But the value of this labour ſo ſaved, is loſt in the cattle thriving leſs, the quality of the manure, the beaſts puſhing and driving each other and illnaturedly preventing others from eating, being worried by flies. *Trampling dung and litter* in the winter, or much rain, gives an *appearance* of rottenneſs very fallacious. Not water, but urine is the proper ferment for dung, (ſays the book); and treading dung as faſt as it is made, impedes fermentation. It is certain (it continues to ſay) that dung made *under cover* (the

and winds of half the year *waſh away and evaporate* from the frozen ground moſt of the rich ſubſtance of the dung ſo dropt about; and the ground, whilſt unfrozen, is *trod cloſe and poached*, to a degree that untills it nearly equal to the value of the dung left on it uninjured. This is illuſtrated: a fodder houſe (a hollow rick made of maize tops in the way of thatch) was ſet up in a field, as is uſual: it was fenced in. At the ſouth front, maize was huſked, and the huſks were ſheltered in the fodder houſe. In the courſe of the winter they were given out to the cattle, in front of the rick.' In April the fodder houſe being then empty was pulled down, and the covering of maize tops was given to the cattle. The ground thus *ſheltered* by the fodder houſe for ſix months, October to April, ſhewed marks of richneſs greatly ſuperior to the ground on which the cattle were

beaſts kept up) is better than made *in a yard*: cattle do better and the food goes further. 14 An. 160.—But is it not better that dung ſhould be rotted, not more than partially, when the ground receives it, that it may ferment and rot moſtly whilſt in the ground?

were foddered during the ſame time: graſs, weeds and crops, during the four or five following years of my remaining on the farm, ſhewed this in their great growth. Where the fodder-houſe, three hundred feet long and twenty broad, ſtood and ſheltered the ground, the richneſs of the ſoil was ſtrongly marked; when but a faint ſuperiority over the common field appeared on the part where the cattle were foddered.

*Litter* is an eſſential; without which *yard* manure is of ſmall account; and unleſs it be in *full proportion* to the number of cattle, it is not thought highly of: but is as a half done thing. Good farmers in England deem *full* littering of ſuch importance that after reaping with ſickles and inning their wheat, they *chop* the *ſtubble* with ſithes, and ſtack it for litter. Beſides ſtraw and ſtubble for litter, they apply to the ſame uſe, fern and ſuch other vegetable ſubſtances as they can procure: and they buy ſtraw from common farmers who are not

not in the practice of littering.* In all countries, common farmers are indifferent to improvements: they look not beyond old habits. A full littering is three loads of 12 or 1300lb of ſtraw to each grown beaſt. In England ſtraw is ſold by farmers who are tenants on ſhort leaſes, who jog on as their fathers and as themſelves were *trained*, and from which they cannot deviate.† It is preſumed that here alſo ſtraw is to be bought. *Maize Stalks* will for a long while coſt little elſe than carriage. A ſkeleton

* Mr. Bakewell (4 E Tour. 449) never litters. He prefers the dung from a given quantity of ſtraw *eaten* by cattle, to a larger quantity gained by *littering*. On which Mr. Young obſerves, that his reaſoning is good where ſtubble, fern, and the like are to be had for littering with; but adds that a ſmall quantity of dung very rich, is not equally efficacious with a large quantity of weak dung that contains altogether equal richneſs. Mr. Bakewell afterwards practiſed littering his cattle in their ſheds.

† "I believe it is never done, except in the vicinity "of large towns; where it is eaſy to exchange ſtraw for "manure to a double profit. Maize ſtalks might un- "doubtedly be converted to excellent manure, but ſeem "to be univerſally waſted." S.

leton frame made of a light wood may be contrived to carry a vaſt quantity when they are dry: but whilſt yet uncured they are better, becauſe of their ſweet and nouriſhing juice, which invites cattle to browſe on them, as they lie under foot in the yard. When they are much trodden they become of a *ſponge-like conſiſtence*, which *retains* the *dung* and the *urine* very effectually. Let us not be ſparing of expenſe, or be dilatory in procuring the neceſſary materials for a *full* littering. It increaſes and preſerves the manure requiſite for the improvement and preſervation of the powers of the ſoil, for enabling it to yield greater crops and more of pecuniary income, and comfort.

In America, ſtraw, ſtubble, maize ſtalks, fern, weeds before they ſeed, flags, wild oats, ſea graſs, and leaves of trees are to be applied as litter. Our farmers ſay, "there is no manure in corn ſtalks;" and they are left ſtanding in the fields. I have been uſed to draw them into my cattle-yard, in the

the fall and during winter; where they were laid thick, as litter to grown cattle, and were trod into a ſponge-like ſtate; in which they catch and *retain* the dung and *urine* of the cattle, ſo as to give a great quantity of rich manure. A farmer near Philadelphia, after inning his wheat crop, *mowed* and ſecured the *ſtubble:* the motives whereof were to preſerve his young clover from being ſmothered by a rank ſtubble, and to uſe the ſtubble as *litter* to his beaſts. This is the firſt inſtance I have known, of *ſtubble* being ſaved in America, with any view to *littering cattle!* Farmer *Ruſh* has thus given an important leſſon, for thoſe who are diſpoſed to ſecond their judgment with determined exertion!

The quantity of ſtraw and ſtubble to be produced in crops, is eſtimated at very great uncertainty beforehand, becauſe of the various growths which crops take in different years. It may be from 50 or 60 to 90 or 100lb of ſtraw alone, for each buſhel of wheat produced. In the Muſeum Ruſticum,

cum, and in the 8vo. volume of ſelect papers from it, are accurate details of a crop of wheat, with its proportions of ſtraw and chaff to that of the wheat.

In November all the cattle are to be *confined* from wandering about the fields. The cattle-yard is then well littered; and as often as the litter is trod into the dung and muck, or is ſoaking wet, more litter is added; ſo that the beaſts may lye always *clean* and *dry*. They are thus confined to a yard and littered till there is a full bite of graſs in May. All the cattle are to be under ſhelter from cold rains during that time. Litter is to be given them, as above.

It is advantageous to a farm, and of ſome immediate income, to have on it as numerous a ſtock of cattle as can be kept *well*, and no more than can be *ſo* kept. It is better to have too few than too many: yet in ſome parts of America, farmers exceedingly diſproportion their cattle to their provender. They will have numbers of hidebound creatures,

creatures, many whereof die from mere want of *food* and *ſhelter:* ſo that leſs meat and leſs manure are derived from a great number ſo poorly kept, than better farmers have from a due proportion well kept. Beſides, does not the man feel ſhame in the cruelty of ſtarving or keeping in a ſtate of want and miſery, a fellow-creature committed to his care? Is it not a truſt to the creature man, from the Father of all creatures?

The live-ſtock is to be as many as can be kept *ſheltered* from cold rains, with *abundant winter and ſummer food.* Of all the kinds, the horſe is the moſt coſtly and the moſt injurious to the farm. He bites cloſe, is almoſt continually treading and poaching the ground; and eats more than the ox as 5 to 3; yet is not himſelf, eatable: when he dies he is loſt for ever. The ox is meat. After having given us his labour, he becomes food to us. Steers are unprofitable: they coſt five or ſix years keeping, without yielding labour; and are then ſold for leſs than

than the coſt of keeping and fattening them. Cows give milk, and oxen give labour.*

Sheep

* Cows and oxen may be fattened and diſpoſed of when 7 or 8 years old. If 6 are to be diſpoſed of, then the ſtock is to conſiſt of 6 calves, 6 of two years, 6 of 3 years, 6 of 4, 6 of 5, 6 of 6, 6 of 7, and 6 of 8 years; in all forty-eight head: whereof thirty give milk, labour, or meat. After marking ſix calves, yearly, the very *beſt* for cows and oxen, the reſt are to be ſold: ſo that not a ſteer is to be raiſed, other than ſhall be neceſſary for oxen. An ox *improves* in value, ten dollars a year from the time that he comes to be uſed and fed as an ox. A horſe *declines*, till he comes to nothing. "Mr. *Cooper* was much prejudiced againſt oxen: but is now ſuch a convert as to have parted with moſt of his horſes. A horſe coſts as much as $4\frac{1}{2}$ oxen: and the ox's keep is in ſummer, *graſs* alone; in winter, *ſtraw:* on which they may be worked moderately. If hard worked, they have hay. In *harneſs*, they are ſtill more valuable. Their harneſs is much the ſame as for horſes; except that the collars open and are buckled on, and are worn contrary to thoſe for horſes: the narrow end of the collars, which open, being downwards;—and as the chains are faſtened to them in the ſame direction as in horſe-harneſs, the beaſts of courſe draw much higher than horſes. The line of the chains is almoſt up to their backs; but much above the cheſt: which is neceſſary from the different ſhape of horſes and oxen. They draw when *in harneſs*, *abreaſt* in pairs, *ſingle* or *in a line* one before another; and walk as faſt as horſes. An *ox-team* five in a waggon, and a *horſe-team*, four in another waggon. Both went

Sheep are profitable. Sows and pigs ought to be eſpecially kept where there is a dairy, as they make a conſiderable part of its profit, from the offal milk. Hogs are advantageouſly kept on green *clover*; and fattened on *potatoes* with *meal* of maize.

Quantity

twice a week, fourteen miles out, and fourteen miles home each day: the load equal, about two tuns. The oxen were generally at home two hours before the horſes; and were in harneſs. Driving with *gentleneſs* and good *temper*, without ever *hurrying*, is found neceſſary to procure their *exertions*. A perſon who drew with *oxen*, two or three years, and made fair experiments comparing them with horſes ſays, an ox value thirty dollars, is equally ſtrong in the draught, with a horſe value ninety dollars, and equally fit for plow, cart or harrow; and that the *ox* requires a fourth part leſs provender than the horſe: alſo that the *ox works* and *increaſes*, from four till he is ten years old; but that ſeven hours work a day is to him as much as eight to a *horſe*." See E. Tour, vol. i. p. 172—vol. iii. 152—vol. iv. 5. 82. 269—vol iii. 398. 418—vol. iv. 268. 273. An. vol. xxiii. 68. 70. *Oxen* may every way be uſed inſtead of horſes: *bridled and rid; harneſſed and driven* in waggons, plows, &c. In Maryland one Sutton Sicklemore rode on a bull about the country; and I have ſeen a woman going to a race, with her cheſt of cakes and ſitting in a truck drawn by a bull *bridled*. In Pennſylvania, I ſaw a waggon drawn by *two bulls and two oxen, bridled and geered in harneſs and collars.*

Quantity of land, alone, is no rule for fixing on the number of cattle to be kept. Not only the quantity and quality, but alſo the ſituation and the crops will affect the queſtion: and the attentive farmer will determine from his experience, how far he is to enlarge or reduce the numbers and kinds of his live-ſtock.

"In many ſituations, ſays Mr. *Young*, "the dependance of a farm for manure, "is on the ſtraw-yard. If in that caſe "the farmer does not properly *propor-* "*tion* his arable crops which *feed* cattle, to "thoſe which *litter* the yard, and both "theſe to the quantity of his *graſs* fields, "the farm will be long before it gets well "manured."

How advantageous for acquiring dung, ſo eſſential for preſerving the productive powers of the earth, is the practice of keeping cattle *up in yards*, well littered—How much more ſo the keeping them *up in houſes*, well littered!—eſpecially, when ſo

ſo *houſed*, if it be on green food cut for them in *ſummer*, and dry food with juicy roots and drank in *winter!* and houſing cattle keeps them in full plight with a ſaving of food.

## BARNS.

Farmers in Pennſylvania have a commendable ſpirit for building good barns, which are moſtly of ſtone. On the ground floor are ſtalls in which their horſes and oxen are fed with hay, cut-ſtraw, and rye-meal; but not always their other beaſts. Roots are ſeldom given to their live-ſtock, and are too little thought of. The ſecond floor with the roof, contains their ſheaves of grain, which are thraſhed on this floor. a part of their hay is alſo here ſtored. Loaded carts and waggons are driven in, on this ſecond floor; with which the ſurface of the earth is there level; or elſe a bridge is built up to it, for ſupplying the want of height in the bank, the wall of one end of the houſe being built cloſe to the bank

bank of a hill cut down. For giving room to turn waggons within the houſe, it is built thirty-ſix to forty feet wide: and the length is given that may be requiſite to the deſign or ſize of the farm. But if the waggon is driven directly into the barn, it may be as directly drawn back without turning it—a great ſaving of room; and the houſe need not be ſo wide as for the ſake of turning waggons in it. If waggons carry more to the barn at a time, yet carts are briſker: their loads are ſhot down in an inſtant, and they turn ſhort. Waggons are tediouſly unloaded.

I have ſeen a barn, in Cheſter county, Pennſylvania, which had a cellar under a floor of planks on joiſts, on which horſes and oxen ſtood; and their dung was daily ſhovelled into the cellar. The farmer ſaid, this dung is the better for being thus kept *dry:* but, may it not be there *too dry?* Dung drowned with water muſt be much injured. But if a large maſs of dung receives no more water than what falls on its

its ſurface from the clouds, and is well ſheltered from the ſun, is it then injured? Is it better or worſe for being rotten before it is applied to the ground as a manure? If firſt rotted, it will ſpread and mix with the ſoil more perfectly. If but partly rotted, and then ſpread and plowed into the ground, inſtantly as it is carted out, will it not be ſtronger—more powerful in opening and enriching the ſoil? It there finiſhes its heat and fermentation, which precede and bring forward rottenneſs, whilſt it is in the ground: provided its lying too thinly diſperſed or ſcattered in the ground is not againſt its fermenting.*

There

* The 4 E. Tour, 452. ſpeaks of dung being put up in a ſmall compaſs, that the *ſun*, *wind* and *rain*, may have but little power over it, to do it miſchief. Of theſe, the *ſun* exhales without its rays adding any known virtue to the dung; and the *rain* when in exceſs, would rob it by too great dilution and waſhing away its ſubſtance: but the atmoſpheric air would impart to it ſome of its rich combinations. For making gunpowder, nitre is collected in beds of ſtraw, earth and rubbiſh, raiſed in thin banks or walls above the ground, expoſed to the air; and ſheltered only from *ſun* and *rain*. From ſuch *thin maſſes*, rains would waſh out the nutritive ſtores, and the ſun

There are not many inſtances of ſheds tacked to their modern barns. Their mode of building, of late, does not well admit of them; and room is gained by all being under one roof. The roof is a coſtly part of buildings: but it coſts no more to cover three or four ſtories than one.

Their barns on the ſides of hills (which they always prefer) may be built three ſtories high, inſtead of the uſual two ſtories. Cut down the hill perpendicularly ſeven or eight feet, and build up one end of the barn cloſe to the bank. The other walls are to be quite free and *airy* from bottom to top. The ground ſtory ſeven or eight feet high; the next thirteen feet—the third alſo thirteen feet; into which grain in the ſtraw is pitched up, and there thraſhed out. If the



would exhale them. But, would what my ſtercories receive of rain, ſoaked into a *large deep maſs* of dung, injure the dung, when there is ſcarcely more than with the urine may be requiſite for producing a fermentation in the dung and litter? If *dry dung* is applied to a *dry ſoil*, it cannot ferment till a ſufficiency of rain falls and dilutes it.

bank is not ſo high as the ſecond floor, or if there is no bank, lay a bridge up to that floor. The width of the barn being thirty-ſix feet clear, a paſſage in the middle, eleven or twelve feet wide, will leave a range of cattle-ſtands on each ſide of it. The cattle are fed from the paſſage; and there ſtraw is cut and meal ſtored. The doors are one to every two ſtalls or four beaſts. They may be latticed, or otherwiſe airy: and at the end of the paſſage next the bank, may be a door opening into a vault excavated from the bank, for keeping roots. The dung may be thrown into a ſtercory ten feet from the doors. There will be no occaſion for carts paſſing between the range of doors and the dung pit or ſtercory. All is carted into the houſe, at the end door of the ſecond floor. The ſtercory may be covered with whatever may ſhelter the dung from the ſun, although it ſhould ſuffer rains to paſs through the covering: but no other rain or water is to have acceſs to the dung, but urine is to be ſaved and thrown on it. One end of the ſtercory or pit is

open

open, where a hill will admit of letting carts in. Air is admitted into the barn through long loopholes in the walls, rather than windows. A good thunder rod, half an inch diameter, inſures the barn againſt injury from lightning at the coſt of leſs than fifty cents a year.

A ſtone barn, lately built in Philadelphia county, has its ground ſtory 10½ feet high; the next 19 feet, and the third 14 feet. Waggons are driven into the ſecond ſtory. Seven feet are high enough for horned cattle. Horſes require more height; and there are inconveniences in keeping horſes and horned cattle in the ſame houſe. The conſtruction of their reſpective houſes ſhould be adapted to their ſeveral purpoſes.

A foreigner aſks, if the ſteam from the perſpiration and breath of the cattle, cloſe houſed, would not taint the hay and ſtraw on the floor above them; and if the houſe being built up againſt the bank would not occaſion an injurious dampneſs to the grain,

the ſtraw and the hay? I have heard no complaint of either, and preſume there is no cauſe for any in a country of ſo dry an air; eſpecially as theſe ſtone barns, built againſt banks, ſtored with cattle on the ground-floor, and containing grain, ſtraw, and hay, on the upper-floor, continue to be preferred.

It is ſaid that cattle are kept very *cloſe* and *warm* in their houſes in *Brabant* and parts of *Germany*. I never knew of out-cattle ſuffering materially by mere cold, unattended with *rain*, *wet ſnow* or *ſleet*. But as often as they experience theſe, their wretchedneſs claims compaſſion: and the owner, feeling for himſelf as well as for the beaſts committed to his care, at ſome time or other may reſolutely practiſe giving them due *ſhelter* and *attention*; and thereby profit of the increaſe of *milk*, of *labour* and of *meat*, if not alſo of ſelf ſatisfaction on ſeeing them through his provident induſtry in *comfortable good plight*, in no want.

What-

Whatever the number of floors or ſtories are, the bank is not to be higher than to the ſecond floor, which is immediately above the cattle floor: ſo that the bank is ſcarcely ever more than ſeven or eight feet high; and to that height at the moſt, one end of the barn is attached to the bank. In Cheſter county, I have ſeen where a bank was cut down three or four feet, and a bridge for waggons was from the top of it four or five feet more, to the ſecond floor of the barn.

## CATTLE-STALLS.

On this particular is here given what I have collected of Mr. *Bakewell's* method of houſing his cattle, from the Annals of Agriculture, or from *John Burnet*, who was ſent to America by Mr. Bakewell with cattle, a few years ſince.

Mr. *Bakewell* keeps his cattle in houſes: in which a paſſage is at the heads of them, to feed from. The troughs out of which

which they eat their hay or turnips (I preſume alſo their ſtraw, for he feeds largely with ſtraw) are 2½ feet wide at top, and ſlope to the bottom which is of brick, three feet long, eight or nine inches deep. The bottom of brick is on the ground. No rack. Every ſtall is ſix feet wide for two cows: eight for two bulls. In each corner of the ſtalls is a ſmooth poſt, with a ring larger than the poſt, for ſliding up and down. A chain, not a foot long, connects with the ring, and alſo with a chain collar round the beaſt's neck, which locks with a T. The cattle can but juſt reach their food next to the diviſion between the two beaſts. Three feet for each cow, are better than more room: in which they lye down. More ſpace would admit of their dirtying each other. Their ſtanding is ſix feet: and behind is a ſtep five or ſix inches down to where the dung falls. The houſe is cleaned once a day; and the cattle are driven twice to water. He has forty-five in one place ſo tied up: and they are fed and taken care of by a man and a boy.

Cows

Cows in milk are not to want water. In the American climate they ought to be watered three times a day in ſummer. Their water ought to be near. Driving cows any diſtance is very injurious to their milk. In England, dairy cows are ſaid to give from 200 to 400 lb of butter. Do the American give 100 to 200? Many attentions are requiſite for obtaining much butter, or good butter—and alſo much and good milk.

Below is a ſketch of Mr. Bakewell's ſtalls;* which are without racks: but the manger is the wider. Next to it is a ſketch of one drawn by a gentleman lately from Yorkſhire; which has a rack leaning with its back part in the feeding paſſage; a trough for food; a ſpace for the cattle to ſtand in; a ſink for receiving their dung; and a way behind the cattle. Lord Holderneſs's ſink to his cattle houſe is ſaid to be without any drain: ſo that the dung, urine and refuſe ſcraps of hay are all mixed there, and barrowed

* *See the Plate.*

ed away from it, together, to the dunghil; which ſeems a good practice, at leaſt where ſervants cannot be depended on for ſaving the urine *alone*, and then carrying it to the dunghil.

### *Cattle Pastured and Soiled in Summer: Kept and Fattened in Winter:*

In ſome of my little eſſays, are intimations of methods for keeping and feeding live-ſtock, very different from the uſual practices of huſbandmen, but being conciſe or in notes, they are too obſcure to be attended to. The ſubject claims attention, from farmers accuſtomed to think with a deſire to improve Such particulars thereon as at preſent occur, are therefore preſented to the conſideration of this claſs of huſbandmen.

As well grain as graſs farms maintain live-ſtock: but their kinds ſize and number proportionate to the means of ſubſiſtence are not ſufficiently attended to; nor are the

the modes of keeping them, and ſaving their manure. They are commonly raiſed on the farm: but, ſometimes are bought full grown, of drovers; and grazed in paſtures.

The common farmer's live-ſtock runs on a ſort of paſture during ſix or ſeven months. In the reſt of the year they are kept entirely on *dry* food, at leaſt in Maryland. Who among our farmers ever think of procuring a *juicy* winter food, for tempering the coſtive effects of dry ſtraw and maize fodder eaten by their cattle? *Juicy* food in general tends to keep their bodies open, their ſkins and muſcles mellow, pliant and eaſy for their better thriving. Hence the fine effect of root and turnip-feeding, ſo highly valued by European farmers.

It is ſaid, cows require in England, from one to two acres of paſture: but the medium of a number of inſtances is found to be one and a third acre. Their paſtures are *made*, by ſowing graſs ſeeds after the ground has been a number of years producing

producing crops, *ameliorating* as well as exhauſting, under *manurings* and *good tillage*. They continue many years afterwards in graſs, carefully cleared of brambles and ſtrong weeds. During the ten or twenty years of their being paſtured, the cattle drop their dung, ſcattered and left expoſed on the ground to exhauſtion by ſun and wind. Some good the ſoil obtains from it: but the continual treading by the beaſts paſtured, has a bad effect in deadening and untilling the ſoil. Nevertheleſs, in ſo long lying unimpoveriſhed by renewed corn crops, the ground is partly reſtored from conſtant though ſlow depoſits of the atmoſphere as well as in an inferior degree from the dung dropt.

Have our *American* lay-fields equal advantages? Very frequent returns of *corn crops* of different ſorts have robbed the ground, generally *without any application of manure*: the ground is then left to a ſpontaneous growth of weeds and a ſour or poor graſs, which give what farmers of eaſe and pleaſure contentedly deem good enough

enough paſture. On this their ill fated horſes, cows, oxen, and ſheep are promiſcuouſly turned early in the ſeaſon before there is a bite: but they nibble off the ſcanty growth of rubbiſh as it riſes. Here they continue till winter: ſometimes through the winter; ſo that the ground becomes poached and trod to a dead cloſeneſs. The dung dropt is but of one or two years, towards reſtoring the ſoil, when *corn crops* are renewed, and reduce it ſtill lower. The acquiſition from detached ſcraps of expoſed dung and from the ſlow effect of the atmoſphere, in that ſhort time, is trifling: and far ſhort of repairing the waſte, from poaching, and quick returns of corn crops.*

Oppoſed to our unmade paſtures, are the *made* paſtures of Europe and ſome parts of

* Witlings may fancy they ſee a palpable contradiction between quick returns of corn crops as here mentioned, ſo greatly impoveriſhing, and as they are recommended, in the rotations, to be every other year. But, their genius forbids them to ſee the difference between *good culture with manures and intervening ameliorating or mild crops*, and bad culture without manures or ameliorating crops.

of America: and oppoſed to *all paſturing*, is *ſoiling*. Soiling is common in Flanders, and is advancing into extenſive uſe in Germany and in England. It is to the preſent purpoſe that theſe practices and their effects be compared.

Advantages in *paſturing* are that *rich* graſs paſture keeps grown cattle at the rate of one and a third acre to a beaſt, during the ſix or ſeven warmer months: *common* paſture, at the rate of two acres to a beaſt. Attendance on them in paſtures is very little. They range at pleaſure and drop their manure on the field, ſo that labour in heaping, carting out, and ſpreading it is ſaved. The diſadvantages are, the graſs and the ground are trod and reduced in value: the paſtures require coſtly diviſion fences: the dung is ſcattered on the ground, expoſed to exhalation and waſte by ſun and wind, ſo as to be greatly reduced: the horſes and oxen are driven to the ſtable with much waſte of time, and ſome vexation and conſequent abuſe.

The

The advantages of *ſoiling* are that the ground requires but few or no diviſion fences: grown cattle are kept at the rate of a fourth part of an acre to a beaſt, during the ſix warmer months; their manure is all well preſerved, and given to the ſoil when and where it is moſt wanted, and in the beſt condition: the ſoil is untrod and left mellow and lively: the horſes, oxen, and cows are always up,* ready for uſe without loſs of time: they are kept cool, ſhaded and leſs worried by flies: they acquire good coats and full fleſh, on a leſs expenſe of food. When it is objected to the laying aſide diviſion fences, that there would be, at times, bad ſeaſons when graſs could not be cut and carried in, becauſe of great

* Except that for a few hours, after they are returned to the ſtalls on the morning watering, they may be let out to ſtrole and rub themſelves in the farm-yard; from 11 o'clock till 3, then put up in the ſtalls; by which they will not have time to drop much dung in the yard: and what is there dropt ſhould be barrowed to the ſtercory. Carried *immediately* to the ſtalls, after being watered, they dung and ſtale plentifully in the ſtalls: then being turned out they do not dung much whilſt in the yard.

great rains, or of cold drying winds which check the growth of graſs, ſo that it would be requiſite there ſhould be ſome fields divided off for the beaſts to run on at thoſe times, the anſwer is that there is another way of providing for the cattle, and that much preferable. In towns we ſee horſes and cattle are kept up on *hay* and *ſtraw* the year round, and that it agrees with them. A quantity of hay is therefore to be kept in ſtore, as a *proviſion againſt ſuch untoward ſeaſons* as ſhall deprive the beaſts of their meſs of cut graſs. Prudent farmers deem it requiſite always to have ſome ſtock of old hay.*

A farmer *paſtures* his ſtock: his neighbour ſoils his. Each has 32 head of grown horſes, oxen and cows.

*Paſtured*

* Beſides, as Mr. Duplaine intimates, maize may be ſown thick, 3 to 3½ buſhels an acre, harrowing the ground even, when the taſſels ſhoot, mow and cure it into fodder. Or cut it daily and give it green to cattle. 9 Muſ. 253.

| | |
|---|---|
| *Paſtured* 32, at 2 a. of common paſture each, . . . . | 64 acr. |
| *Soiled* 32, at an acre of cut graſs to 4 beaſts . . . . . | 8 |

gained 56 a. by *ſoiling*; which will keep 224 cattle: or give 140 tons of hay, worth 1400 dollars.

Accounts given of cattle *ſoiled* in England, make the beaſts ſoiled to be 4 to 6 head from an acre of cut clover. Mr. Wynn Baker, who was an accurate experimenter, found an acre kept five head, the graſs partly cut from head-lands.‡ A farmer in England *ſoiled* 20 horſes and 7 cows, from 7 acres of clover, without giving any corn or hay. He cloſely watched the management of his tenant with the ſame number of ſtock *paſtured* in a field; and it proved that one acre mown went as far as ſix paſtured. When his beaſts had eaten 5 acres, the tenant's had conſumed 30 acres, and his horſes were in inferior condition.

When

‡ See the note † page 144.

When *ſoiling* is recommended, farmers having inveterate habits, or who are driving after pleaſures, equally check all that might be ſaid, by vehemently objecting to the *labour and expenſe* of cutting, carting and giving the graſs to the beaſts; and the farmer of lounging habits, ever ſeeking for ſhort cuts and even for nothing to do, can never find time for cleaning ſtalls and ſaving and carrying out dung, eſſential as they are.*

A man and a boy perform all the work and attendance in ſoiling 40 to 50 beaſts. They cut graſs, enough in the morning for the evening feed; let it lay to deaden a little, and cart it in, in the evening. So the morning feed is cut in the evening to be carried in, in the morning. Suppoſing all the work performed in 3 hours of the morning,

* He is a bad farmer who ſeeks for nothing to do. A good farmer knows how to accompliſh the ordinary round of work, and it is without grudging full labour for having it complete. The ſhort cut which would do it but ſomehow, and not perfectly, he ſpurns at. When all this is done he ſeeks to improve the eſtate.

morning, and 3 of the evening, there then remain 6 hours for other work. The expenſe of the man and boy is therefore but one half chargeable to the ſoiling account: but even let them be 8 hours employed in ſoiling, or two-thirds the expenſe.

| | | Dols. |
|---|---|---|
| Reckoning on only 32 head, they give per year 320 loads of rich manure | | 300 |
| Time daily ſaved in catching the beaſts: ſoil left untrod and lively: gentleneſs and docility of the beaſts, value | | 40 |
| Wages and expenſes, a man and boy, a year 200, off $\frac{1}{3}$ | 140 | |
| Gain, in ſoiling, . . . 56 acres, or 140 tons of hay, | | 1400 |
| | | 1740 |
| | | 140 |
| Net gain | | 1600 |

Will you ſpurn at the offer of 1600 dollars that you may avoid paying wages and expenſes of a man or two? Theſe herdſmen would be requiſite for *winter* feeding, cleaning ſtalls and ſaving manure, even if the beaſts were paſtured in ſummer inſtead

of being ſoiled. How little then is chargeable to the ſoiling!

It is in this caſe unwiſe to ſuffer the mind to be biaſſed by apprehenſions of expenſes which evidently muſt be greatly below the benefit acquired. Let us make trials of this new method of managing cattle: ſuppoſe at firſt our horſes and oxen ſo kept. How docile, how well fleſhed, what healthy coats, and what a valuable quantity of manure of the richeſt and moſt perfect kind on the ſpot!

Many horſes are kept up, in towns, the year through; except only whilſt they are employed: and all cattle thrive better, on leſs food, when tied up than when at large in fields. Even ſheep are ſo kept. The celebrated Mr. Bakewell, lately deceaſed, tied up his favorites, at leaſt during winter: I believe too his choiceſt rams were tied up the year through, except for the moment of giving them the ewes, to run together in a lot, for they were not to be ſeen out at other

other times. In keeping *ſheep* up, they ought to have room, and much freſh air in ſeparate apartments, according to their ages and ſexes, allowing to ewes with lamb a great portion of room.

Without knowing the quantity of cut graſs that beaſts may *daily* require, 75lb are aſſumed; which quantity would cure into 17lb of hay: but it may be that leſs of green graſs would cloy them than what might when cured into a feed of hay.

It is ſaid, 28lb of green clover cut up, with 14lb of ſtraw cut into chaff and mixed together, are a feed for a day to one beaſt; which agrees with 75lb of green clover alone: what a ſaving of clover! But in the ſeaſon of ſoiling, clover is plentier than ſtraw; and ſtraw is an eſſential in winter: ſo that 8lb or leſs of ſtraw and 40 of clover may be better. When $4\frac{1}{2}$lb of green clover cures into one of hay, 28lb are equal to $6\frac{1}{4}$ of hay: to which add 14lb of ſtraw; the whole is equal to $20\frac{1}{4}$ of dry food.

But the ſtraw is inferior to the ſame quantity of hay; and 17lb of hay is a good allowance to full grown beaſts per day. As much ſtraw cut and mixt with green clover as will but improve the cud, is ſufficient; and it ſeems 8lb of ſtraw to 40 of green clover will anſwer, or even leſs: for clover alone anſwers for the purpoſe of rumination, though not ſo well as when aided by ſtraw or hay.

*A Table of Food for a Day, in Soiling grown Cattle.*

| Beaſts. | Clover alone. | Clover & ſtraw. |
|---|---|---|
| | lb | C. 40 |
| 1 | 75 | S. 8 |
| | | 400 |
| 10 | 750 | 80 |
| | | 800 |
| 20 | 1500 | 160 |
| | | 1200 |
| 30 | 2250 | 240 |
| | | 1600 |
| 40 | 3000 | 320 |
| | | 2000 |
| 50 | 3750 | 400 |

The herdſmen ought to know how much clover and ſtraw to cut and give daily; that there may be enough without waſte. If not enough the beaſts ſuffer: if too much of green clover or graſs is cut and brought in,

in, lying in a heap it ferments, turns ſour and is loſt. Till herdſmen are well practiſed, it may be well that they meaſure each meſs, and chalk down how much a baſket and cart body hold of the articles, in weight. The practice will at leaſt have a deſirable tendency of leading ſervants to obſerve *method;* the value whereof in all buſineſs is nearly as *right* is to *wrong*. Without method, random flights predominate and divert employment from its beſt objects to unimportant or waſteful purpoſes.

On the ſuppoſition that 75lb of green clover, alone, ſuffices, in the morning are carried to the 32 beaſts, 1200lb: in the evening the like quantity. Eight acres, cut four times* in the ſeaſon of ſoiling, is about

* In ſome years this might be accompliſhed. In other years the cuttings would be not more than *thrice;* or even in years of ſevere droughts might be not more than *twice*. In caſes of neceſſity the horſes and cattle can be tethered awhile; and hay may be reſerved to ſupply ſuch deficiencies of graſs. Mr. *Boys*, in 20th Annal, ſtakes his fine team horſes, all ſummer on clover.

about once in every ſix weeks: or near 30 perches are cut in *a day:* that is 15 in the morning, 15 in the evening; or a ſquare of near four perches each time. Would it require ſix hours to cut, cart in and give to the beaſts a ſquare of eight perches of graſs, beſides cleaning the ſtalls and heaping or depoſiting the dung?

But, in many parts of America are idle improvident people, maſters of farms, who ſpend their time in taverns or other places of waſteful amuſement: any where rather than at home. Theſe haunts are at the expenſe of their *domeſtic* happineſs. Sooner or later they bring on them debts, wants and grating claims of creditors. Such a people can never be brought to ſoil cattle, or at all improve their farms. Where is ſolid comfort to be found if not at *home?* The meanneſs, the ſelfiſhneſs and the folly of theſe *huſbands*, *fathers* or *maſters*, are conſpicuous, degrading and ſhameful; who, regardleſs of *wife*, *child* and *dependents* claiming their protection, their affections and

and their attentions, and even regardleſs of the true intereſts of their precious ſelves, fly from their own happineſs in the moment when they mount their horſes and hurry to the tavern, the race, nine-pins, billiards, exceſs upon exceſs of toddy, and the moſt nonſenſical and idle chat, accompanied with exclamations and roarings, brutal and foreign to common ſenſe and manners as the mind of wiſdom can conceive of depraved man. Had theſe men, ſo deficient in character, been trained but a few years among the orderly, thoughtful good farmers of ſome neighbouring diſtrict, they would have learnt valuable leſſons for conducting their farms, themſelves and their domeſtic affairs, greatly to their comfort and advantage, and to the comfort due to their families and dependents; to whom they owe more than they are accuſtomed to feel for them. There are, on the other hand, thoſe who with induſtry aim at providing for their families, but it is not with an honeſt mind and fairneſs of reputation. The ſtrength of theſe is in low cunning. If indeed

deed they wiſh to be perfect in that deteſtable of all qualities, *country-cunning*, they need not go far from home; unleſs for the ſake of embelliſhing the ſatanical talent with ſome variety. They might then go among the thoughtleſs claſs of people in neighbourhoods diſtinguiſhed for more of this baſe quality than of provident induſtry, fairneſs and honeſt candour.

The ſoil of the ſtates ſouth of Pennſylvania, has been impoveriſhed by the ſtaple articles of produce tobacco and maize. Maize being cultivated in large fields for feeding ſupernumerary negroes, and alſo for the market without ever being manured, is the chief exhauſter. Tobacco ground in detached parcels is manured, and ſo far is helped: but the hand-hoe ſcratchings and ſcrapings expoſe the ſoil to be hurried off by every guſt of wind or rain, and its nutritive contents to exhalation by the ſun and wind. Another great evil attending tobacco-making is the attentions to it which are unceaſing and unrivalled, ſo that the due culture

culture of all other articles of huſbandry is loſt in that of tobacco. Houſes are ungrudged for curing tobacco, two to eight or ten houſes are cheerfully built for this crop; but not one for *live-ſtock;* nor a blade of hay for them, though multiplied beyond the preſent means of keeping them on the pretence that the more the cattle the more the dung for the tobacco: but the tobacco planters herein deceive themſelves; for, their cattle being pinched in quantity and quality of food, give a ſmall portion of but lean dung; and becoming hide-bound and expoſed to ſleet and cold rains, die in great numbers, yearly. For renewing the redundancy all calves are reared—But enough of theſe gloomy and barbarous practices!

Humanity ought, and ſelf intereſt well underſtood, will at ſome time or other, induce the erecting *houſes for cattle.* The like motives ought to make meadows, provide great quantities of good food, and proportion the cattle to the means of keeping them ſo as to have many, and no more than as many

many as can be comfortably kept in good heart.

Some account is already given of the houſes and method of keeping cattle up in ſtalls, by Mr. Bakewell and farmers in Pennſylvania.

The great difference, beſides, of the American and the European modes of winter keeping live-ſtock, is in the Europeans giving with *dry* food, *roots or liquid food*; which the Americans generally neglect, whereby their cattle become coſtive and hide-bound. The Engliſh give *turnips*, the Germans *drank*.

Mr. *Young* gives an account of an ox-houſe, which in England is reckoned very complete. The owner, a Mr. *Moody*, keeps 26 beaſts, each in a ſtall 8 feet wide for large oxen, 6 feet for ſmaller. How different from Mr. *Bakewell's* of the ſame country; which are ſtalls 6 feet for *two* cows,

cows, 8 feet for *two* bulls.* Mr. Moody's has at the head of each ſtall, a ſquare manger, for hay put in through a window in the wall oppoſite to the beaſt's head. The hayſtacks are in a yard at the back of the building; ſo that the feed of hay is taken from the ſtack, and at one ſtep put into the manger. On one ſide the hay is a ſmall ſtone ciſtern, as a trough to eat oil-cake out of. On the other ſide is another ſtone ciſtern for water; which is thus ſupplied: Outſide the houſe is a pump which raiſes the water into a ciſtern, exactly on a level with all thoſe that receive water for the oxen. A pipe of lead leads from this pump ciſtern to all the others in the houſe; ſo that it may be ſeen by the height of water in the pump ciſtern, how high it is in all the reſt. The houſe is ſhut quite up. In the doors are holes to let in air: but ſliding ſhutters exclude it at pleaſure. At one end of the houſe is a ſmall room for oil-cakes,

* Mr. Bakewell *kept* beaſts: Mr. Moody *fattened* them. Does this occaſion the difference; or is it not an error, in applying 8 and 6 feet ſtalls to *ſingle* beaſts?

cakes, and a ſtove with a broad iron top, for laying on the cakes to be heated a little for breaking. A block ſtands by it, on which the cakes are broken.

Mr. Moody is ſingular in the practice of ſweating cattle, for promoting their fattening. He ſays, the hotter they are kept the better they will fatten. He ſhuts them up, and for ſome time lets in no air through the holes of the doors. The breath of ſo many and the heat of their bodies, ſoon bring them to ſweat prodigiouſly; and when this is at its height, they fatten beſt and quickeſt. After ſweating two weeks, the hair all comes off and a freſh coat comes, like that in the ſpring: after which they ſweat no more. He adds, thoſe beaſts which do not ſweat at all ſcarcely ever fatten well. His beaſts are a large ſort, from 80 to 130 ſtone.* He gives to thoſe of

100

* 1100 to 1800lb; or 280 to 450lb a quarter: or is it meant a ſtone of leſs weight by the cuſtom of the place? Such deviations ſupported by local cuſtoms are perplexing.

100 ſtone, two oil-cakes a day for two months: then three, till fat: *alſo* 20lb of hay each a day; of which they eat only the prime part. Lean beaſts are kept on their offal hay. Such a beaſt in winter fatting eats above 30 dollars worth; but he improves in value more than to that amount.

There is a great difference between *keeping* and *fattening*. Mr. Bakewell *keeps*: Mr. Moody *fattens*: and there is much difference in the expenſe of *ſummer fattening* on *graſs*, and fattening on *winter food*.

We, in America, *keep* cattle through the winters, on ſtraw, maize fodder, and huſks, giving them water, though much better juicy food or drank: and *fatten* on hay, cut ſtraw with meal, linſeed jelly, &c. in the winter: on graſs in ſummer. It is requiſite that they have *ſalt* very frequently; eſpecially when tied up: and it is beſt made up with fine clay into a maſs, to be licked, as in the wild ſtate beaſts *lick* earth, in ſpots, for obtaining ſalt.

Oil

Oil cake is ſaid to be a great fattener, and gives doubly rich dung; but becoming dear, *linſeed* jelly is taking place of it in England. This jelly is a valuable diſcovery; and ought to be introduced into America, for fattening cattle. Hay, meal, and linſeed jelly with drank, muſt be excellent food in ſtall-fattening. Linſeed jelly is thus made: 7 of water to 1 of flaxſeed ſteeped in a part of the water 48 hours: then add the remaining water cold, and boil *gently* 2 hours, ſtirring conſtantly to prevent burning. It is cooled in tubs, and given mixed with any meal, bran and cut chaff. Each bullock (large) has two quarts of *jelly* a day: equal to a little more than *one quart of ſeed in four days*. Cattle ſix or ſeven years old fatten moſt advantageouſly to the grazier. Their ſummer grazing is commonly but a preparation to ſtall-fattening.

*Obſervations on Cattle, Sheep, and Hogs.*

In judging of the preference to be given to different kinds of cattle, ſize is far from being of the firſt conſideration. Their being

ing of a large kind implies *bulk* rather than *character*. It may be preſumed the maſs of meat and bone contained in three beeves, generally requires *no more food* than the ſame quantity in one beef. But there is a rage in America for *large* horſes, *large* cattle, *large* ſheep, *large* hogs; whether they are more or leſs docile, active and productive of net income, or are kept and fattened with more or leſs coſt or not. This formerly was a diſtemper of the mind among farmers in England; of which they have been cured by experience and the obſervations and communications of ingenious inveſtigators on the nature and qualities of the ſeveral breeds, reſpecting *uſe* and net *profit*.

The common cow-kind of Maryland (the ſame I believe as thoſe of Virginia)* are

* The old breed of Virginia cattle is meant. Whether the cattle of Maryland were firſt introduced from what the Virginia firſt adventurers brought with them from England, or that the Roman Catholic Maryland adventurers encouraged by Lord Baltimore brought a few with them, is uncertain. But, from the high value ſet

are valuable as they are hardy, feed cheaply, yield milk well if *houſed* and *well kept* in *winter*, are docile, laborious, and give a fine grained good meat, with a due proportion of tallow. But being in common very meanly kept, they want ſize. When well fed and houſed, they are of a good ſize for all uſeful purpoſes.

Northward of the Suſquehanna, this old breed is moſtly ſupplanted by new kinds, imported from Europe and valued more for their great ſize and heavy appearance than good qualities. They have large bones with a deep flat-ſided but maſſy appearance, and their fore-quarters are heavier than their

upon cows by the firſt adventurers to Maryland, which alſo ſeems to imply but few cattle and little intercourſe with the James River Proteſtant ſettlers and prior adventurers, who then diſliked each other, it is probable ſome one or two cows were brought from England directly to St. Mary's in Maryland; which were ſo eſſential to the colony as to have occaſioned a law declaring the puniſhment of death for killing a cow. If my memory is correct it was in one of the books of land records in Maryland, that when a youth I ſaw an account of the convicting and ſentencing a man to be hung for "killing a cow." But he was pardoned.

their hind; in ſome breeds amazingly ſo: which indicates their keeping and fattening hardly and coſtly; beſides that their meat is coarſe, and they are diſproportioned in their weight of bone. The old breed of the country have the fore and hind quarters weighing nearly alike: mine at Wye had the hind-quarters a few pounds heavier than the fore. What a contraſt to this is the weight of the quarters in beeves ſometimes killed in Philadelphia! The common weights of my—

| | lb | lb |
|---|---|---|
| Wye cattle, from graſs, the fore quarters | 122 | hind 124 |
| A Philad$^{a}$. ox, highly fed from a calf, | 403 | 280 |

The famous Blackwell ox was reckoned the fineſt though not the heavieſt beaſt ever killed in England. His *hind* quarters weighed more than the *fore*, nearly in the proportion of the old breed in Maryland. His legs were very ſmall-boned and neat, according to the picture and account of him publiſhed.—This Blackwell, not Bakewell, fine boned ox weighed thus:

The two fore-quarters 1057lb
hind-quarters 1067

How very different from theſe are the huge lubberly beaſts, once in faſhion in England and now becoming ſo in America! which are imported into different parts of it. One of that character was killed in England, under five years old: a ſhort-horned, big-boned clumſy beaſt; and weighed,

The two *fore*-quarters 1107lb
*hind*-quarters 924.

A big-boned ſteer, killed in Philadelphia, weighed,

The two *fore*-quarters 805lb
*hind*-quarters 560: and

A big boned ſteer in New-Jerſey,

The two *fore*-quarters 758lb
*hind*-quarters 525.

The Maryland old breed if well *fed and ſheltered*, would be a good ſize: and if cautiouſly

tiouſly mixed with other breeds, the moſt *uſeful* and *productive* of *net* income, would be improved. But it is with much caution that we ſhould admit other breeds. There are better; and certainly there are much *worſe*.

A Mr. Fowler, in England, with great care and judgment, changed for the better; in chiefly introducing Mr. Bakewell's long-horned beef cattle: which are not ſo remarkable for great ſize or *quantity* of milk though very *rich*, as for their giving *meat* on the parts which ſell for the moſt money by the pound *from a given quantity of food*; and for their fattening on *leſs food*, and that on the moſt valuable parts. The horns of the few I have ſeen, though long were very ſlim: either hanging downward, or ſtanding wide nearly at right angles to the cheeks. Yet the experienced Mr. *Bakewell* allows for ſuch cattle but ſix feet width of ſtalls for two cows, that is three feet each, and eight feet for two bulls. More room he ſaid would admit of their turning and

dirtying each other. The young cows, lean, appeared to me like racers compared with the heavy big-boned cattle coming into faſhion in America.

There may be breeds preferable for American farms to Mr. Bakewell's valuable cattle; eſpecially the *Suſſex* old red, *Suffolk* polled, and the *Hereford* breeds: but it remains to be aſcertained by experience. Mr. *Young*, ſpeaking of Suffolk cows, ſays the quantity of *milk* they give exceeds that of any other breed he has met with, and that there is hardly a dairy of any conſideration in the county of Suffolk which has not cows giving early in June, eight gallons of milk a day; and ſix are common among many for a large part of the ſeaſon; and five gallons a day medium in a whole dairy for two or three months. It is alſo obſerved by him, that this breed is much inclined to *fatten*, and the *milk* excels in *richneſs* as well as being abundant.* Yet after

* Lord Egremont has a *Chineſe cow*; whoſe milk is ſingularly rich. One pint of it, on experiment, yielded

after Mr. Young had ſaid this, and kept of the Suffolk breed a number of years, and had been well acquainted with Mr. Bakewell and his breed of cattle, he purchaſed for his own farm, a bull and two cows of the *Suſſex* old breed, having had a great deal of riding in ſearch for the pureſt of that breed; they being eſteemed excellent for *milk*, for beef, and for *oxen*. He gave about fifty guineas for the bull and two heifers, which were the beſt he could procure in Suſſex. The *Suffolk polled* cattle coſt rather leſs money.

Beſides the *Suffolk polled* and the *Suſſex* breeds, there is a *Hereford* breed, preferred by

as much butter (4 ounces) as ſeven pints of the milk of *a Suſſex cow*; both were churned directly from the cows; without being ſet for cream. This Chineſe cow is deſcribed as being ſmaller than any Alderney cow: ſeems very fat; and as clean in the chap as a deer. This fact confirms other obſervations on the *quality* of the milk of different breeds of cows. It is the *quality*, not the *quantity* of milk, that ought moſtly to be attended to. *Suffolk* cow's milk is not ſo rich as that of *Suſſex* cows. 20 An. 281.

by Mr. Marſhal and Mr. Campbell, as the beſt in England for *oxen*, for *dairy*, and for *fattening*. The European cattle beſt worth attention in America, are the *Bakewell* long horned, the *Suffolk polled*, the *Suſſex* and the *Hereford*; alſo the ſmaller Engliſh breed mentioned below, having ſmall fine bones and being well formed, with generally a brindle or red colour and white along the back and acroſs the thighs and fore legs or the ſhoulders; and likewiſe the white breed, having a *yellow ſkin* and brown ears, alſo mentioned below.

There is on the other hand, a large, bony, coarſe meat breed of cows, which give a deal of *milk-and-water*, rather than milk, and feed expenſively. It has had its run in England againſt other breeds, till its bad qualities were noticed. Some of this breed are imported into America, and eagerly ſought after: for they have *bulk* and certain faſhionable fancied charms about the *head and horns*. Mr. Maurice, a farmer in England, as Mr. Young informs us, changed

changed his better *Shropſhire* breed, for the then faſhionable Holderneſs and Dutch ſhort-horned cattle, eſpecially becauſe they gave a great deal of milk: but he ſoon found they were *coſtly* in feeding; that they were *tender* in keeping, and gave the *pooreſt milk*. He thereon got rid of them for other breeds, chiefly Bakewell's.

Thoſe ſhort-horned cattle feed to vaſt weights; yet are not profitable to the breeder, the grazier, or the dairy-man. How poor the milk! twenty-four quarts of their cream yielded 16½lb of butter; and the ſame quantity from the long-horned gave 28lb of butter. From Suffolk polled cows, 18 quarts of their *milk* have given a quart of *cream*; which yielded 1¼lb of *butter*. "Holderneſs cows and their relations, the "Fifes, give the greateſt quantity of milk; "and the coarſeſt grained meat. *Fine fleſh*-"*ed* cattle give *milk of a better quality* and "higher richer flavour." In reſpect to food, 30 long-horned, it is ſaid, will winter 100 dollars cheaper than the ſame number

number of ſhort horned. Mr. Young informs the world of theſe obſervations and opinions of farmers in England; who attend to and well know the qualities of the reſpective breeds of cattle.

The rage for *large* beaſts is not now ſo great in England as it has been, or as it is in America. The breeds having flat broad ſides, large deep fore-quarters, large bones and legs, and that with their deep fore-quarters are lank on the hinder parts, have injured our better common breed in ſome of their beſt qualities. Our old breed milk well, if houſed and kept in good plight *during winter*: or, in other words, *if as well kept and attended to* as the favourite new comers. The Maryland old breed of ſteers will fatten in common 600 to 800. I have raiſed and killed of them fed to upwards of 900lb, at only five years old.

There is a fancy in country people by which they often eſtimate the qualities of cattle from their colours: but this is a falſe ground

ground on which to judge of them. Different diſtricts of people preferring ſome one and ſome another colour. The red, the black, brindle, brown, dun, pied, are favourite colours with different people. A cow is ſaid to be *good* becauſe of the *quantity* of milk ſhe gives: but, this cow and her offſpring may be *bad* on all other accounts, in compariſon with other cattle. She may be tender, hard to keep, and give coarſe flabby meat and poor milk. It is indeed obſerved of white cattle that ſuch as have a *white ſkin* are tender in keeping: but there is a ſtriking difference between white cattle having a *white ſkin*, and ſuch as have a *yellowiſh ſkin*. They are different breeds, of different natures and qualities.

On my farm at Wye, were uſually wintered 170 head of cow-kind, young and old; of the old breed of the country, and of various colours, though moſtly red, brown, and brindle. About the year 1774, I began to mix this breed with a rather ſmall but well-formed, ſmall-boned Engliſh breed.

breed. The cattle from this mixture were generally brindle or red with a daſh of white acroſs the ſhoulders or fore-legs, the thighs, and along the back. The ſtock was thus improved in gentleneſs and in milk. About the year 1785, theſe cows firſt had my fine bull, Horace, who was out of a country cow by a bull imported by the late Mr. Calvert, from Mr. Wildman a dealer in England. My cattle were further improved from this mixture, in *gentleneſs*, in *draught*, *meat*, *milk*, and *ſize*. As oxen they were *active* and *powerful*, and very docile. Horace and his ſire had white hair on a *yellowiſh ſkin*, and their ears and noſes were a reddiſh brown. Such Lord *Anſon* found the cattle of *Tinian* to have been; and he eſpecially commends their gentleneſs and the good quality of their meat. Did Lord Anſon or others import the breed from Tinian?

Farmers are impoſed on by butchers; who by praiſes prevail on them to prefer the breeds having large bones, and that

are

are deep fore-quartered heavy looking beaſts; whoſe fore quarters outweigh their hind quarters, with the aid of their maſſy ſcimitar-like ribs. Why do butchers recommend this beaſt of bone? Why do farmers comply with their ſubtle recommendation? Is it becauſe their appearance is agreeable to the farmer's paſſion for what is *big*? The choiceſt beef is on beaſts having ſmall bones. The Bakewell cattle and ſheep have not the heavy appearances of the clumſy, big-boned, and flat-ſided beaſts preferred by retailers of meat: but they are greatly ſuperior in their meat, and in cheap feeding.

*Breeders* of cattle will attend to the difference in *expenſe of food* requiſite for the big-boned, and the ſmall-boned lighter formed cattle: and the *conſumer* of meat may compare the weight of bone and meat in a quarter of the ſmall-boned with one of the large-boned breed. The greater the proportion of bone, the oftener he recurs to the butcher. In general, ſmall-boned animals,

animals, carry it even to man, fatten more readily and with leſs food than the large boned.

The firſt great error in improvers of live-ſtock, in America, is in their paſſion for the *largeſt kinds*. The *largeſt* and the *ſmalleſt breeds* are the very worſt; and ought to be avoided in cattle, and generally in all animals. The huge big-boned dray-horſe, what is he on a farm? the ſcimitar-ribbed, flat-ſided lubberly big-legged cattle, what are they other than expenſive maſſes of unimportant bone, with an inferior portion of coarſe meat dearly obtained in the feeding.

"No quantity or quality of food *given* "*in ſummer*, will procure milk in good "quantities, from cows that have been "*poor in the preceding winter*;" whether their mean plight be owing to a ſcanty allowance or poor quality in the food, or to a want of ſhelter. *Dry food* from ſtraw, or from huſks and fodder of Indian corn, cannot

cannot carry cattle through winter in *full flesh*, unless there be added some *juicy or moist food*, to prevent their becoming costive and hide-bound. Turnips and the common fleshy pompions may be given in the fore part of winter; the red thin fleshed more hardy pompion, potatoes, wurzle, ruta baga, and other hardy roots or cabbages afterwards; and *drank* with any dry good food, till there is a *full bite* of grass in *May*. With common care I have kept the less fleshy pompion having a deep orange-coloured rind, till the 25th of March in a cellar having a small vent for vapour at the South front. Cows ought to have *hay* from a month before calving. The vines of field peas and beans are excellent for cows and for sheep.

That *salt* is advantageous to all live-stock is well known: but the giving it to them is not sufficiently attended to and valued. For health it is admirable and even necessary. It is said, it enables the farmer to increase his stock, as it *augments the nourish-*

*ment*

*ment* of the food eaten in proportion to the quantity of ſalt eaten; and that there can be no exceſs in the ſalt eaten, give as freely as you pleaſe. It alſo is ſaid that ſalt greatly improves wool in quality as well as quantity. It ought to be without ſtint always before them; mixing it with water and pure fine clay in a maſs, for them to lick it, as in their wild ſtate, rather than to give the ſalt alone. In twenty years reſidence on my farm at Wye, a *ſalt water* river, and always having there upwards of 50 horſekind, I know of no inſtance of their having botts. Near 60 years ago a famous country horſe doctor told me that once or twice a week giving ſalt to horſes, effectually ſecures them againſt botts; which I have ever ſince well obſerved, and believe it to be perfectly juſt.*

SHEEP.

* Salt ſeems to be neceſſary to all animals. In 1775, I was deſirous to make experiments for producing nitre and common ſalt. A tobacco houſe yielded the former, and Wye river the latter. From the firſt trial of the river water was produced a pint of fine grained ſalt. From a rapid boiling the ſalt was too fine to be ſtrong. It was ſpread in a diſh, and placed on the ground in a

## SHEEP.

Mr. *Bakewell's* ſuperior diſcernment and attentions, produced a new breed of ſheep; which is ſpreading over England, and is diſtinguiſhed by the name of *Diſhley* ſheep. They are deſcribed as having fine lively eyes, clean heads, ſtraight, broad, flat backs, round bodies, very fine ſmall bones, thin pelts, with a diſpoſition to be *fat at an early age*, They become peculiarly fat, with a very fine grained and well flavoured meat, above all other large long woolled ſheep. There are much larger ſheep in England. The weight of the Diſhley carcaſs in general is, ewes three or four years old, from 18 to 26lb. a quarter; wethers, two years old, 20 to 30lb. The wool on a medium 8lb. a fleece: the length from ſix to fourteen inches. There have been muttons of other breeds in England, which

yard to be dried and hardened; and was ſome days expoſed to ſun and wind. Numbers of ſmall ants proceeding in lines, like Indian files, bore off grains, to them huge maſſes of ſalt, to their ſtores.

which weighed above 60lb. a quarter. But large ſize was no object with Mr. Bakewell.

The wethers of the Diſhley breed are killed when *two years* old; becauſe they then yield the moſt profit; and if kept longer they become too fat for genteel tables. One killed when three years old, meaſured ſeven and an eighth inches of ſolid fat on the ribs, and his back from one end to the other, was like the fatteſt bacon. At *two* years old, they commonly cut four inches thick on the ribs, and two to three inches all down the back. Ewes fattened from July to Chriſtmas give 18 to 24lb. of tallow. Country houſe-wives cut off redundant fat, and make ſuet dumplings or paſte of it: and ſome cure the ſides as flitches of bacon. But, the great object, to Mr. Bakewell, of producing this very extraordinary breed of ſheep, was the *ſuperior quantity and quality* of the mutton obtained *at the leaſt expenſe of food* and waſte of time!

Mr.

Mr. Cully, a noted breeder, ſays the mode of management of this breed is thus: "The ewes lamb in March, and then a few turnips are given for increaſing their milk.* The laſt of June or firſt of July the lambs are weaned and ſent to middling

O

paſtures.

* I preferred to have my lambs drop about the 20th of March in general; allowing only 8 or 10 ewes in a hundred to give lambs early as is common. Theſe few lambs, coming in December, January or February, periſhed at the rate of twenty or thirty in a hundred. What of them ſurvived had a ſtart of what dropped between the 20th and the laſt of March; but for want of green juicy food to the ewes, they were bony and poor; when the latter, from their dams having graſs ſoon after their yeaning, and when the lambs are ſo young as to require leſs milk at that time than the early lambs, were always thriving and in good plight, whilſt growing of the graſs increaſed with the growth of the late lambs. By July theſe were equal to the early lambs; and what is very important ſcarcely any of the March lambs died; ſo that in the one caſe near 100 lambs were raiſed; in the other ſcarcely 80. It is proper to keep the March ewe lambs from the ram till October come twelve months after they are yeaned; and even the early lambs would be the better for it. My few early lambs were for early meat: but if among them there was a promiſing fine-formed ram or ewe or two, they were kept over for ſtock. This at Wye-Iſland.

paſtures. The ewes are thereon milked two or three times, for eaſing their udders; and ſuch as are not to be continued for breeding, are put to clover till it fails: then they get turnips, and are ſold about Chriſtmas, very fat, at the price of 750 cents to 9 dollars. His ſterling money is reduced to dollars and cents.

The lambs after being weaned adds Mr. Cully are put to turnips in the beginning of November, and continue at them till the middle of April or firſt of May, and then are put into good paſture on ſecond year's clover. The ſecond winter they have turnips till the clover is enough grown, generally the middle of April. They are clipt about the middle of May, and ſold by the end of June for 9 to 11 dollars.

One third of the Diſhley breed of ewes are reckoned to have two lambs each: ſo that 60 ewes have 80 lambs. They are put to the ram ſo as to have lambs at two years old; and are kept for breeding until three or four years old; except ſuch as

are

are of particular good forms or other valuable properties: theſe are kept as long as they will breed. Such as are defective in ſhape, ſuſpected of being *ſlow-feeders*, or of having other unprofitable qualities are never put to the ram."

It is a rule applicable to all ſorts of live-ſtock, to breed from ſtraight backed, round bodied, clean, ſmall boned, healthy creatures; carefully avoiding ſuch as have roach backs and gummy heavy legs with an abundance of external offal and lubberly maſſes of *coarſe*—any thing.

Fifty or ſixty years ago the ſheep in Maryland were nearly all of one breed; of which I ſhould be at loſs to find one at this time. They were light made, and clean boned; giving at four or five years old the beſt flavoured mutton, dark and juicy. The wool was in but moderate quantities, yet of good quality. They were called rat-tail ſheep, from the tail being ſmall and round.

The only ſheep of Mr. Bakewell's breed being in America, that I have heard of, are what the Rev. Mr. Tooſy, an improving farmer from England, brought to Quebec. Mr. Tooſy lately died there. A country gentleman in Maryland, who has a number of farms, was offered in a letter from England, which I read, what he might want of Mr. Bakewell's Diſhley ſheep, to be ſent to him by the letter-writer. But alas! the gentleman declined all thought of having them; and even ſaid he ſhould not anſwer the letter. I therefore wrote to the perſon in England. But the ſhip carrying my letter ſprang a leak and put back. That I never received an anſwer was, probably, owing to the letter miſcarrying; from the Engliſh farmer who was to deliver it not having renewed his paſſage.

*Sheep, on a Farm bordering on a Salt River in Maryland.*

I uſually ſheared about 130 ſheep, moſtly ewes: they paſtured through the ſummer, with

with little other attention than now and then counting them. In winter they alſo ſhifted for themſelves, in fields of ſpontaneous graſs and weeds, without being houſed, or fed with aught elſe than a few corn blades, if ſnows happened to be ſo deep as to deprive them of their common paſture food, and ſome green food from tailings of ſmall grain ſown; and alſo a few—too few roots, to 18 or 20 muttons. The flock however had a large range, beſides the two fields of rubbiſh graſs and weeds, ſheltered by pines at the heads of coves. They found food amongſt buſhes and weeds on points and broken grounds along the margin of a ſalt water river.

An eſtimate might be made of a flock of ſheep ſuppoſed to be improved when in numbers affording a ſhepherd conſtantly to attend them, feed them, and uſe the beſt means to preſerve them in ſafety and good plight. But the ſtatement below is of 100 ſheep as they were kept by me, with too little care.

Eſtimates

Eſtimates vary greatly. Scarcely two men are found to agree in the articles of charge and diſcharge; and the attentions and the neglects of ſheep, with the modes of keeping them are various: which may apologize for the preſent eſtimate being ſo different from others. No charge is made of intereſt: it is but ideal when not really paid, and when inſtead of paying intereſt, I actually receive from the ſheep, as ſo many bonds carrying intereſt, an annual income of above ſix times ſix per cent, on their value, with rent and all expenſes. No charge is made for common caſualties; becauſe a flock ſyſtematically managed, is not thereby leſſened or reduced below the deſigned number whilſt new ſheep are continually raiſed, at no perceptible expenſe, and fill up the place of thoſe loſt. So it is of the ſheep ſold off: their place is filled by the ſtock lambs kept for the purpoſe. It may be ſaid of ſheep ſo attended to, as is ſaid of kings—they never die. When inſtead of their being loſt they are ſold or conſumed in the family, we receive the value;

value; for which the flock is to have credit in the account kept of them; juſt as money received on bonds. A lamb coſts ſo little in raiſing him, that by the time he ceaſes to be a lamb his wool pays the coſt. A charge might be made againſt ſheep for damage in untilling ground; from their treading it and thereby eventually injuring the future crop of wheat, on an arable farm, more than their dung ſcattered in ſcraps improves it:* but then, againſt this difference, may be ſet off in ſome inſtances at leaſt, the advantage derived from their eating down or preventing to riſe up into ſeed many ſticky, ſtout weeds, which other live-ſtock ſuffer to grow up, foul the paſtures, and reduce the ſoil. I have doubted of making a charge againſt my ſheep for their paſturage; becauſe in an arable ſyſtem of huſbandry ſome fields muſt neceſſarily be in graſs,

* *Sandy* ſoil, not being the common or general ſoil of the country, is not here under conſideration. The ſoils, in general, are loams and clays. The loam is of two kinds: that which partakes moſtly of ſand, called ſandy-loam; and that which partakes moſtly of clay, called clay-loam.

graſs, ſpontaneous or ſown, and on theſe they graze: but on a grazing farm there is no rubbiſh field following a grain crop, ſo that graſs is the only tenant which can pay the rent; and it would be nice and difficult to ſatisfactorily apportion the rent between arable and grazing fields. If upon the whole, between treading the ſoil and deſtruction of weeds, and the giving ſome ſmall improvement from dung whilſt paſturing, ſheep do no notable damage to the ſoil of an arable farm, I ſee not ſufficient cauſe for charging the flock a full paſture price for the pickings they get from fields turned out from tillage, at preſent, for the benefit of future corn crops or as being neceſſary in a common arable ſyſtem. The little benefit which ſoil receives from ſheep paſturing, where there is not any ſummer folding may be about balanced by damage in deadening the ſoil (other than ſandy ſoil) with their feet, as it ſeems to me: but I conclude on charging 20 dollars, for their paſturage.

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An eſtimate of the income and expenſes of 100 ſheep, as kept at Wye in Maryland:

| | Cents. | |
|---|---|---|
| Corn blades, occaſionally, | 800 | |
| Winter green food and roots to 18 or 20 muttons | 1000 | |
| Some ſlight attendance | 400 | |
| Paſturage | 2000 | |
| Taxes, waſhing, ſhearing | 800 | |
| | | 5000 |
| Wool 338lb, at 25 cents | 8450 | |
| Lambs 40 out of 80, ſold at 120C. | 4800 | |
| Muttons, 20 wethers at 240 C. } 15 ewes at 180 C. } | 2700 | |
| Manure in paſturing, and treading the ſoil, oppoſed | | 15950 |

| | | |
|---|---|---|
| Annual Income | 159 | 50 |
| Annual Expenſe | 50 | 00 |
| Annual Profit *Dls.* | 109 | 50 |

This is a profit of 109 cents and 5 mills on each ſheep: or 1095 mills on each of the one hundred ſheep; which is more than lands diſtant from ſuch a river can give, with no better management. In England, the Duke of Grafton's accurate account of ſeven years ſheep buſineſs, gave an average of but 633 mills net profit on each

each ſheep. His expenſes were on keeping very ſmall ſheep, which gave but about 1¾lb of wool each, and were for graſs, rent, county-poor and pariſh-rates, rye, rye paſturage, turnips, hay, barley, waſhing, ſhearing, carriage of wool, tithe, and intereſt. The 633 mills amount to 25 per cent net profit, on his capital. Others in England reckon they gain 110 to 400 cents a head, on their ſheep. They ſpeak of ſterling money; which is here reduced at the rate of 100 cents for 4s. 6d. ſterling; and 100 cents are a dollar, 10 mills one cent.

As far as dung is received by ſoil it ought to be allowed for; and this is meant of dung applied from ſtock kept up or folded: but how far, it is to be valued when ſlowly dropt about in *paſturing*, is a queſtion. Beaſts conſtantly ramming the ſoil into a cloſe compact ſtate, untill it more than is commonly apprehended. That the foot of the beaſt does more damage to wheat ſoil than his dung ſo diſperſed and expoſed to exhalation and waſte does good, is probable from

from ſeveral inſtances related of clover fields having been divided, and one half paſtured on all the ſummer, the other mowed twice, and both ſowed at the ſame time with wheat on one plowing, when the mown gave conſiderably the beſt crops of wheat. Let it be ſuppoſed that a lay of graſs has been left *unpaſtured* for three years; another like field at the ſame time is paſtured cloſe as is uſual, during the ſame three years: now let the farmer walk in theſe, and obſerve how mellow, light, and lively the one is; how hard and dead the other. Which of them would he prefer for giving him a crop? If the former, it may then be ſuſpected that paſturing but very little, if at all, improves the ſoil. When however paſture ground has been of *many years* ſtanding, eſpecially if clothed with graſs for ſhielding the ſoil from the midſummer ſun, it will have gained improvement from the atmoſphere and the ſcraps of dung together, that will be greater than the injury from treading the ground. After two or three years, the ſettling and hardening of the ground,

ground, probably, will not much further be increaſed.

Amongſt the attentions to ſheep, it is adviſable to ſuffer a few ewes to run with a ram, at large, for giving *early lambs*; and that the reſt of the ewes be kept from the rams till the middle of October, and then be allowed a ram to 20 or at moſt 25. Their lambs will come from the middle to the end of March. It is alſo proper to keep ewe and ram lambs apart 18 or 20 months, from January or March till October come twelve months. It is beſt that there be not more than *one* ram with a diviſion of ewes at a time; where they can be parcelled off into ſeparate lots, for two or three weeks.

It is neceſſary to obſerve the ages of ſheep: and ſome age ought to be fixed on by the farmer, beyond which ſcarcely any thing ſhould induce him to keep them. At ſhearing time the mouth of every ſheep and lamb is to be inſpected; and the lambs having

having blackiſh gums or that are not ſtraight, well made and promiſing, are marked for ſale; as alſo are the aged rams, ewes and wethers. Whatever is the age fixed on, for clearing the flock of old ſheep, as many lambs, the *beſt*, are to be turned out for breeders, and for muttons, proportioned, as there are meant to be aged ſheep diſpoſed of; and a few more for ſupplying loſſes whilſt they are growing up. The idea of four or five years old, was long retained from the practice of keeping muttons of the old, *rat-tail* breed to thoſe ages, for obtaining the beſt flavoured meat. But I prefer two or three years of age, for the new breeds in America.

The farmer will firſt fix on the number of grown ſheep to be kept by him: then on the age he means to obſerve for diſpoſing of them; for he is to have none in his flock that are not in full vigor. Dividing the number in the whole flock, by the age at which he means to diſpoſe of them, directs to the number of lambs he is to turn out,

out, as a ſupply for the ſame number of ſheep to be diſpoſed of from the old ſtock: and a few more lambs may be turned out with the ſtock lambs, for making good any loſſes. If two years are fixed on, for the full age, and there are 100 ſheep, the twos in a hundred being 50 times, direct to the diſpoſing of 50 aged ſheep; and to the turning out 50, more 4 or 5; in all 55 lambs. But the ewes are to be 4 years old. Then the fours in 60 ewes are 15 *ewes to ſell*; and the twos in 40 wethers (together 100 ſheep) are 20 *wethers to ſell*. In all ſell off 35 old ſheep; and turn out 35 more 5, are 40 lambs to be raiſed. After 5 or 6 years of age, ſheep decline in figure and wool. Brambles are charged by common farmers with taking off all the wool that ſheep appear to have loſt: but when ſheep decline in vigour and good plight, they decline in the quantity of their wool, and look mean, even in paſtures clear of brambles.*

At

* Mr. Samuel Jones, in an addreſs to the Philadelphia county ſociety of Agriculture, recommends that on account of the failure of wheat crops, from depredations

## HOGS.

**At Rhode Iſland a hog weighed 824lb, alive; and 715lb when it was cleaned for market.**

by the Heſſian fly, Indian corn, rye, and buckwheat [why did he omit *barley*, ſo eſſential to beer] ſhould be the only corns ſown; and that clover ſhould be increaſed, for food to an increaſe of ſheep. He ſays 10 acres of clover, with a ſmall help, will paſture a hundred ſheep. His eſtimate of expenſe and profit on the hundred ſheep, is thus ſtated:

| | Cents | Cents | |
|---|---|---|---|
| 100 Sheep, value 12000: intereſt | | 720 | |
| Salt 10 buſh. | | 266 | |
| Buckwheat ſtraw, 6 loads | | 480 | |
| Hay 2 loads | | 2133 | |
| Indian corn 100 buſh. | | 4000 | |
| Deaths 5 | | 600 | |
| | | | 8199 |
| Wool 300lb | | 10000 | |
| Lambs 80 | | 8000 | |
| Manure | | 2640 | |
| | | | 206.40 |

| | C. |
|---|---|
| Income | 20640 |
| Expenſe | 8199 |

Profit on 100 Sheep 124.41. Each ſheep D. mills. 1.244

market. Was it fattened with a leſs quantity of food than would fatten four hogs of 180lb each? Wherein is the advantage of having ſuch a huge maſs of coarſe meat *in one* more than in three or four hogs of a better meat? The Chineſe hog mixed with the American old breed of white hogs having ſtiff,

Of *Buckwheat ſtraw*, Mr. Jones ſays: "it is found, by experience, valuable in feeding ſheep during winter. The ſtraw is put up in ſmall ſtacks, ſoon as thraſhed, round a pole fixed in the ground; *ſalt* being ſprinkled amongſt it, in making up the ſtack." This information agrees with that of an attentive tenant, in Maryland: and yet, in general, but little account is made of the ſtraw of buckwheat; and till within a few years, it was but ſeldom ſaved. It indeed ſeems to be but lately that the *grain* has had its value and advantages known: and it is daily coming more in faſhion and eſteem. Even whilſt growing it may be eaten as a graſs, by cows. Its meal muſt be excellent in *drank*, and for working horſes, mixt with cut ſtraw: for hogs, at firſt duſted on potatoes, afterwards potatoes with maize meal; and in all *ſwill* and *waſh*: alſo for poultry: but is never to be given to ſaddle or travelling horſes; nor to horſes or oxen when to be put to briſk work. It injures ſoil leſs than other corn; and is the moſt excellent *ſhelter to graſs or clover*, ſown at midſummer. Scarcely any thing exceeds it as a green dreſſing manure—the plants plowed in before they produce any ſeed; and it is the cheapeſt plant ſo applied.

ſtiff, erect ears, as I have experienced, gives an excellent breed, which is hardy, feeds cheap, and weighs 160 to upwards of 200. The meat of this breed is fine and cloſe, curing well and preferred by thoſe who have raiſed them. Of this mixt breed I killed a litter of thirteen pigs at eighteen months old; and they weighed when killed and cleaned, odds of 2700lb: an extraordinary inſtance!

But, it is ſaid by farmers in Pennſylvania, that lumps of fat of the coarſe flabby meat hogs ſooneſt cloy labourers. This may continue to be an irreſiſtible motive with ſome claſſes of folks; when to others it will be diſguſting and contemptible. Yet if we can oppoſe the 715lb hog by one of 716, though it ſhould be a maſs of inferior meat, we ſhall have a ſomething to give us conſequence—the biggeſt hog! At a Niſi Prius court, in Maryland, a perſon was introduced to me, whoſe horſe had lately won a race. This victory, as I was told, recommended him, though not

before thought of, as being qualified to repreſent the people in their legiſlature. An election ſoon followed; and the horſe—if you pleaſe his influence carried the election for his maſter, all hollow. So might 716 of even the coarſeſt flabby pork ſucceed againſt 715 of better meat. Quality with ſome country people is unimportant.

The 19 An. 291, ſays wean pigs in nine weeks. Sell ſucking pigs at three or four weeks old. Wean in March, and *not later than July*. Litters average ſeven pigs; of which five are raiſed, after all hazards: and that in four months, ſeventy fat hogs gave 106 loads of *dung;* they taking that time to fatten. In Maryland they are fattened on maize given in ears, in two months, from ſome time of October, and killed 10th to 20th December; weighing 150 to 200, after eating ſeven or eight buſhels of maize: with which no food is comparable in giving firmneſs to their fat. It is good economy to pen them for fattening, the firſt of October. They thrive beſt in a mild

mild ſeaſon; and the bacon may be early cured, before the approach of ſpring and warm weather. Salt is not given them that I know of; but I would offer it to them to be taken or not at their pleaſure, and not by forcing it on them mixed among their food. Why do ſows ſometimes eat their pigs, though abounding in food? I can only gueſs, it is for want of common ſalt, that they ſeek to find the condiment in the animal juices.

*Maize and Potatoes conſidered as Fallow Crops and Fattening Materials.*

In eſtimating and comparing different materials for feeding live-ſtock, the value of the rent and culture expended for procuring them, and the condition in which the ſoil is left by the culture and crop, ought to be conſidered.

When potatoes are cultivated under *manurings* and repeated *horſehoing* or ſhimming, and then are *plowed up and hoed out*,

the high ſtate in which the ground is thereby left, preparative to a ſucceeding crop, pays for cultivating the potatoes. The ground is left in the beſt condition for receiving *barley and clover ſeeds* in the ſpring. *Wheat* cannot follow potatoes to the beſt advantage, in Maryland, becauſe of the lateneſs of the ſeaſon. But it ſeems juſt that the expenſe of cultivating and preparing the ground, ſhould be apportioned between the crops; becauſe as it is neceſſary that the cultivation ſhould be given for gaining a good potatoe crop, it is equally ſo for gaining a good barley crop, and both partake of it. Add the country value of both crops together, and aſcertain the apportionment arithmetically.

The cultivation given to *maize* alſo leaves the ground clean and light for receiving ſeed-wheat or other crop. It however is far inferior to the preparation given in cultivating potatoes. No manure or but little is given the maize ground; and it is left in hillocks and ſinks. Apportionments are

alſo to be made of the expenſe between maize and wheat crops.

When maize ground is *manured*, it is beſt not to ſow wheat on it; but leaving it a clean fallow till the ſpring, then (perhaps after adding more manure between autumn and ſpring) ſow barley and clover ſeeds. Wheat is to be ſowed upon plowing in this clover.

Cultivating ten acres of *potatoes* may coſt, dollars 36.60; and it prepares the ground for a crop of *barley*, to follow the potatoes. What of the coſt ought to be charged to the reſpective crops? The value of the potato and the barley crops are to be ſeverally aſcertained. The potatoes produced by ten acres are 1700 buſhels, at 15 cents they amount to 255 dollars; and the barley, 300 buſhels, at 60 cents, to 180 dollars: together 435 dollars. Then,

| | | D. C. | |
|---|---|---|---|
| as 435 : 36.60 : : 255 | = | 21.50, | the apportionment on the coſt of *potatoes*. |
| as 435 : 36.60 : : 180 | = | 15.10, | the apportionment on *barley*. |

So

So on the culture of the 50 acres of *maize*, the produce, 750 buſhels, at 50 C. amounts to 375 dollars; and the *wheat* ſown on it produces 600 buſhels, at 100 cents, amounting to 600 dollars: together 975 dollars. The coſt of cultivating the 50 acres of *maize* is 250 dollars. Then,

| | D. C. | |
|---|---|---|
| as 975 : 250 : : 375 = | 96.11 | apportionment of coſt on *maize:* |
| as 975 : 250 : : 600 = | 153.89 | apportionment of coſt on *wheat.* |

It is ſaid, a hog of 224lb is fattened in 60 days with 24 buſhels of potatoes and one buſhel of meal. At which rate a hog of 160lb would require 17 buſh. of potatoes, and $\frac{7}{10}$ of a buſhel of meal. An acre ought to yield not leſs than 200 buſhels of potatoes; ſay 170, and of maize 15 buſhels. Potatoes are beſt when boiled or ſteamed.

One hundred hogs weighing each 160lb, fattened with 17 buſhels of potatoes and near three pecks of meal, each, will eat altogether

together 1700 buſhels, the produce of ten acres, and 70 buſhels of meal, the produce of $4\frac{7}{10}$ acres: together $14\frac{7}{10}$ acres. The 100 hogs, if fattened with $7\frac{1}{2}$ buſhels of maize, each, would eat 750 buſhels of corn the produce of fifty acres.

See then the difference between fattening with *potatoes* and with *maize*. An expenſe in rent and culture is paid on 50 acres, for producing the requiſite quantity of *maize*; when the rent and culture for producing the *potatoes* with a duſting of meal, are only on $14\frac{7}{10}$ acres: and,

| | D. |
|---|---|
| $14\frac{7}{10}$ acres of *potatoes* and meal fatten 100 hogs weighing 16000lb, of the value of . . | 960 |
| Rent and culture 3.66 an acre, off . . | 54 |
| | —906 |
| 50 a. *maize* fatten no more . . . . . | 960 |
| Rent and culture 5 dol. an acre off . . | 250 |
| | —710 |

So that there is gained on *potatoe* feeding 196 dollars more than on *maize* feeding 100 hogs: near two dollars a hog.

Reckon-

Reckoning on four millions of ſouls, and ten of them to each farm, gives 400,000 farms. Each farm fattening ten hogs weighing 1600lb at ſix dollars a hundred, gains 96 dollars: and fattening on *potatoes* gaining 196 cents a hog, more than fattening on corn, gives an increaſed gain of nearly twenty dollars to every farmer who kills ten fat hogs, more than if he had fattened on maize.*

*Potato food* requiring but $14\frac{7}{10}$ acres produce for fattening 100 hogs; when *corn food* requires 50 acres for fattening the ſame number, is to each farm of 10 hogs 1.47 acres for potato ground, or five acres for maize: ſo that every farmer fattening ten hogs with *potato* food (including a duſting of meal) has the uſe of $3\frac{53}{100}$ acres; and the nation the uſe of 1,412,000 acres, more

* Perfection in eſtimates is not to be looked for. Different ſituations vary them, as well as difference in experience and habits of thinking. Principles are aimed at.

more than if the hogs were fattened on *corn*.

But make an eſtimate on what the farmers might gain without difficulty, rather than on what is ſuppoſed they do gain with inferior attentions. Inſtead of 1.47 acre in potatoes, double the quantity. Then 2.94 acres at 170 give 500 buſhels of potatoes: which at 17 to a hog (with ſeven-tenths of a buſhel of meal) inſtead of ten would fatten twenty hogs on each farm. The ſuperiority of potato food, would give the farmer near forty dollars, on twenty hogs, more than if he had fed with corn: and the ſuperiority, among all the farmers in the nation, would be ſixteen millions of dollars, yearly, beſides what the ground, ſaved as above, would yield in other produce.

We may count upon all the arable land of farms, yielding a *yearly* income, *without any part lying idle* in rubbiſh old field: not as what is the caſe at preſent, but as believing

ing that perpetual *alternate* crops from the whole plowable land will inſenſibly become very general, as the ſpirit for improvement ſhall, though ſlowly, advance on the grounds of reaſon and experiment. With theſe may be eſtabliſhed *ſound and familiar ſyſtems of the beſt agricultural employment:* in which *ameliorating*, or mild crops, will be at leaſt as frequent as *exhauſting* crops.

Improvements in agriculture will probably be firſt introduced amongſt us by ſoldiers, ſailors, phyſicians, clergymen, or others who become huſbandmen with minds unfettered by the confined views and habits in which common farmers are trained, according to thoſe which had been fixed on and handed down through many generations. Attentive huſbandmen will at firſt only look on, aſhamed to imitate; which would imply deficiency in their own practices: yet, after a while, they will cautiouſly begin to adopt certain of the approved new practices. Varying theſe in ſome unimportant particulars, they will cheriſh them as diſcoveries altogether

altogether their own. It is a ſort of apology they make to themſelves, for their imitating improvements pointed out by men they deem ignorant of what themſelves practiſe and deem to be farming.

## *FENCES.*

Whether we have large or ſmall portions of rail timber on our eſtates, it is adviſable that a beginning be immediately made towards acquiring permanent live fences. It withal would be a pleaſing work, giving a kind of new creation on the eſtates: and would afford the pleaſing reflection to future poſſeſſors, that *this is the work of a provident man, who has thus benevolently promoted ſo much good, and ſet this excellent example of a well choſen employment.*

A ſcarcity of timber and even of firewood, ſenſibly affects the apprehenſions of huſbandmen in many parts of the country; and it increaſes rapidly. We may aſk ourſelves, how we are to incloſe and divide our

our fields when in a few years timber ſhall be much more exhauſted. Inclination to plant and raiſe trees from ſeeds, is too little felt: and yet planting is a very important meaſure, which ought immediately to have its beginning, and then be always attended to in future, for reſtoring timber for all the purpoſes of agriculture. This buſineſs is avoided by ſome people, becauſe they cannot live to ſee the plantation grown up into timber: or if it might be expected, yet "there is enough to laſt my time: let thoſe plant who come after me." Others delay it from leſs blamable motives; the aukwardneſs and doubt how to begin it, in what method, where, &c. Let them, however, *begin it any how*, rather than continue to heſitate year after year.

There have been ſpirited endeavours of ſome farmers in Kent county, Maryland, to have fences requiring little or no timber. They cut up turf, laid it on edge, and filled in with earth ſcooped up, ſo as to form a bank without a ditch. They ſaid, this fence

fence is quicker made, than they could make a common worm-fence from the tree; which would require felling the trees, cutting into lengths, mauling into rails, carting in from the woods, and putting up. But this ſort of bank fence was ſoon given up. The pretty green ſides of the banks were cut down by the hoofs of horſes; and in ſome inſtances droughts penetrated the thinner maſſes of earth, and killed the graſs growing on one or both ſides: then all crumbled away, and the fence was ſoon proſtrate. Theſe farmers had merit in the attempt to promote an improvement in fences. Their next deſign was to leſſen conſumption of timber by erecting poſts with rails, inſtead of the common worm-fence. It may ſave ſome timber. Poſts and rails look well, and are not yet out of faſhion; though being chiefly of oak, the poſts ſtand only a few years, and the fence frequently wants repairs. Pleaſed with the appearance and the hope of ſaving timber, I completed a few hundred yards of a poſt and rail fence; when reflecting how ſoon it

it would require to be renewed, and that timber then would ſcarcely be at command, the mind reſorted to the uſage of the old countries in Europe, where want of timber muſt have long ſince driven huſbandmen to the experience of other modes. On inquiry, I clearly preferred their *hedge and ditch* fence; and gave up poſts and rails.

Various kinds of plants have been recommended for making live fences. Plants having ſmall leaves are preferred, and of theſe ſuch plants as have thorns and ſtubbed rigid parts growing cloſe, for reſiſting the preſſure of beaſts.* In England are fences made with hedges without ditches, as well as with them. The laſt are greatly preferred: and their better farmers ſay, "A hedge without a ditch is no fence."

Being perſuaded that poſts and rails muſt ere long give way to the more permanent ditch and hedge, and that it is beſt to take to

* See Of Bramble Hedges, in miſcellany notes, pa.

to theſe at once, I loſt no opportunity of gaining information concerning them; eſpecially it was a queſtion how thorn plants might be obtained in numbers requiſite for making all my fences. In the mean while ditches were made, with intention to place poſts on the banks, with two or three rails inſtead of five, as is uſual when there is no ditch, until young thorns meant to be raiſed ſhould be fit to plant on the banks. Having white thorn trees from Europe, a quantity of their haws was ſowed, not one whereof grew. In different years and methods they were afterwards ſown, as were ſweet briar ſeeds, to no purpoſe. The late General Cadwalader likewiſe ſowed haws of the country thorn without effect, until he was informed that young thorns were ſeen to be grown through cow-dung dropt near a road. From this hint he penned up a number of cattle and fed them during winter with bran mixed with haws. The place was then plowed up and the dung of the cattle covered with earth. In the next ſummer the ground was there abounding in young

young plants of the country haw or thorn tree: but they were ſoon much injured by graſs and weeds, for want of the ground being previouſly fallowed or cleaned.

Afterwards, about the firſt of March 1786, I procured a quantity of the freſheſt cow-dung to be put in a tub: warm water was poured on it, for reducing it to the conſiſtence and warmth as if in a beaſt's maw. Haws were then thrown in, and all was ſtirred up and placed near a conſtant fire, for keeping it warm as blood, but no great exactneſs was obſerved. It ſtood thus three days; and was at times repleniſhed with more warm water, for preſerving its heat and conſiſtence, and frequently ſtirred. A clean well cultivated piece of ground was then opened with a hoe, and the whole contents of the tub were drilled in the row and covered.

On the 26 March 1787, I firſt noticed that young thorn plants were grown up from thoſe haws in good numbers and in great

great vigour. Had the ſeeds been ſo prepared and drilled in the autumn 1785 when they ripened, they probably would have given the plants in the ſpring 1786. With the like preparation it is likely that poplar, aſh, juniper, cedar, ſweet brier and other ſeeds would as readily ſprout and grow. The ground ought to be previouſly well prepared, that it may be clean and mellow for receiving the ſeeds: which growing in rows admits of the plants being perfectly and eaſily hoed.

It was intended to procure the hedges in two ways: by ſowing haws along near the foot of the bank, next the ditch where the ſoil is beſt and deepeſt, there to remain; and by tranſplanting quicks from a well cultivated nurſery. But it was prevented by the failure of the ſeeds, as above: and I removed from the farm before I could apply the new diſcovery, in growing haws. To have good live fences there muſt not only be ditches with the hedges, but alſo a cloſe attention is to be obſerved to weed

and keep the ſoil clean, and the hedge defended from cattle and ſheep, eſpecially during the firſt three or four years: and the young plants are to be often *viſited*, and may or not be trained to grow intwined together; but the branches are to be ſhortened from time to time, and in due time the whole may be plaſhed. Gaps on theſe viſits are to be looked for, and ſtopped before they become frequented by hogs, dogs or boys.

My ditches were $4\frac{5}{10}$ feet wide at top, 10 inches at bottom, 3 to $3\frac{5}{10}$ feet deep. The common labourers of the farm, men with ſpades, women with dirt ſhovels and hoes, after a few days of aukward work, will rid off theſe ditches at a good rate; and make a permanent bank five or ſix feet high from the bottom of the ditch. Two or three rails on this, whilſt the hedge is growing, make a temporary fence that nothing will attempt to croſs. When the hedge becomes full grown, there then is a perfect live fence, without any expenſe of *timber*:

and

and it is liable neither to rot or to be eaſily pulled down.

It is a comfort to be aſſured that when deſigning to have thorn fences, we can readily procure any number of plants from haws. The nurſery ſhould be of good ſize, that the quicks may be very abundant, for ſelecting from them the beſt.

" It is a general practice (beſides the law) in Scotland, that if one proprietor of land wiſhes to make an incloſing fence for his own convenience, adjoining to his neighbour who will not join therein; then the firſt erects the fence entirely at his own expenſe, without claiming any part of the expenſe from the neighbour, until the neighbour avails himſelf of it, by making it a part of a fence for incloſing on his ſide alſo; at which time he pays to his neighbour the half of the original expenſe in making that fence, and is at half the expenſe of upholding it ever afterwards. This is alſo a rule adhered to reſpecting partition

walls that mutually belong to adjoining buildings; and appears to be conſiſtent alike with the ſtricteſt equity and good neighbourhood." And. Eſſ. Agr. 28.

I revere the memory of the huſbandman who has left to travellers, the handſome legacy on the main road near New-Caſtle, a view of an excellent *thorn-hedge-fence*, a valuable pattern for their encouragement or imitation; and have wiſhed to ſee ſome ſort of monument on the ſpot, erected by the country, for perpetuating the memory of the man who ſo early inſtituted the important leſſon. Rewarding thoſe who introduce advantageous practices in huſbandry is good economy in nations; as huſbandry is the moſt general and moſt neceſſary employment of their people.

Doctor *Hart* obſerves that—" The true genius of animating agriculture muſt reſide in thoſe who hold the reins of government, and in gentlemen of all denominations: nor ſhould rewards be wanting, nor public premiums

premiums, nor marks of favour: for, as agriculture is the moſt uſeful ſo was it the firſt employment of man."

## *TREADING WHEAT.*

This is an univerſal practice within the peninſula of Cheſapeak: and in the early ages was performed in the old countries by oxen; as it ſtill is in Barbary and ſome other countries. In Britain, and in all the American ſtates northward of Maryland, the flail is the common inſtrument for thraſhing out wheat: both modes are fixed habits in the reſpective countries. Oxen have been tried in Maryland, by a perſon who had been uſed to tread with horſes; and he found them very exceptionable. I have had wheat from Barbary, which was extremely dirty.

Accounts of treading out ſmall corns with *horſes* may entertain perſons who are unacquainted with the practice; and the method following may aſſiſt farmers in general who are

are uſed to treading wheat, with ſome particulars for improving their practices. Until ſome other as ſpeedy a method ſhall be diſcovered and introduced, treading cannot be diſpenſed with wherever the deſtructive wheat-moth-fly abounds.*

Prejudices againſt treading wheat are great, in thoſe who are unacquainted with the ſuperior methods of performing it: mine were ſo whilſt I was but beginning to be a farmer in a country where the flail was very little uſed, and when treading, as far as I knew, was conducted in a ſlovenly manner. Some farmers ſtill ſhift their treading floors from field to field; from whence much rough-feeling dirty wheat goes to market. Thoſe who have a proper earth, in a perpetual floor uſed for treading crops of wheat, year after year, will have it gloſſy, and the wheat from it will have no more

* The *thraſhing-mill* certainly gives this method; and in every reſpect is a ſuperior inſtrument for getting out wheat from its ſtraw. But it is not uſed in America that I know of.

more dirt than if thraſhed on plank with flails; provided they are attentive in taking off the horſe-dung directly as it is dropped, and let not the horſes ſtop, to ſtale, until each journey ends and they are led off, and provided that as ſoon as the treading ſeaſon is over, they cover the floor thick with ſtraw or rubbiſh, to remain till a week or two before they are to tread in the next ſeaſon. They may fodder cattle on it all winter, and thus improve the floor to be harder, more gloſſy and perfect. When horſes in halters are led in ranks, each rank kept as far apart from the others as can be, time is given for taking off dung dropt before the next rank tramples on it: and in this detached way of travelling the horſes are kept cool. It is important that they do not cloſe their ranks.

I was always much hurt by the injury done the horſes in my former aukward manner (the common practice of the country) of driving them looſe; and withal their driving, kicking, and joſtling each other, helter-

helter-ſkelter; but am now quite pleaſed with treading wheat, ſince haltering and leading them in ranks prove the labour or injury is leſs than from ploughing them half a day in a maize field. The above are the only objections occurring to me againſt treading wheat with horſes. The advantages are—an entire crop of wheat beat out before the end of July, which perfectly ſecures it againſt the moth-fly; leaves but little opportunity to pilferers, and is ready for an early market, often the beſt. To hire thraſhers or put my labourers to thraſh it out with flails, the time ſpent would give abundant opportunity for thieving, which is avoided by the ſpeedy method of treading, when in about a fortnight three thouſand buſhels may be ſecured, inſtead of near a hundred days that flails would require.

Treading floors are ſixty to a hundred feet diameter. Some are only forty feet; others again, a few, one hundred and thirty or more. The larger the diameter the

the eaſier to the horſes. I never knew a horſe diſordered on a large floor, but on a floor ſixty feet or under, it is not uncommon. The track or path, on which the ſheaves are laid and the horſes tread, is twelve to twenty-four feet wide, or more. In common, the floors are incloſed by fences; and the horſes are driven, between them, promiſcuouſly and looſe, each preſſing to be foremoſt to get freſh air, joſtling, biting, and kicking the others with bitterneſs. Their labour is thus in the extreme. Small floors have a centre ſtake, to which hangs a rope, or a pole and ſwivel, and four or five horſes being faſtened together, travel round, upon the ſheaves, abreaſt.

I preſume not to offer inſtruction to farmers who are experienced in treading on large permanent floors properly kept and with horſes in regular ranks: but to the leſs experienced and judicious, I ſubmit the method I have uſed of late, as the beſt within my knowledge. My floor is unincumbered with any fence. A barn ſixty feet

feet ſquare is in the middle of it; around which the horſes travel, on the bed of ſheaves about twenty-five feet broad; ſo that the diameter of the whole is one hundred and thirty-five feet.

Previous to laying down the ſheaves of wheat the preſent ſtate of the air, and probability of its continuing, during the day, dry and fair, or its threatening a thunder guſt with rain, is conſidered. If the concluſion be to tread, then the morning is ſuffered to paſs away till the dew is off the ſtacks and floor. A row of ſheaves is firſt laid flat on the floor, with the heads and butts in a line acroſs the track of it as a bolſter for receiving other ſheaves with their heads raiſed on it; and theſe ſheaves range with the path and circle, the butts reſting on the floor. Other ſheaves are in like manner ranged, with the heads raiſed on the former ſheaves, till the whole floor be filled, and appears to be with nothing but heads of wheat, ſloping a little upwards. The thickneſs of the bed of wheat depends partly on the

the length of the ſtraw, and cloſeneſs and high range of the ſheaves on the bed. Upon laying down the ſheaves for the bed, their bands are cut with a knife. It is wiſhed that the wind come from the weſtward, when treading. From the eaſtward it is generally damp. It is preferred to place the ſtacks eaſtward of the floor, for giving a free paſſage to the better winds from the weſtward.

In my treading, twenty-four horſes are formed at ſome diſtance from the floor into four ranks; and when the floor is ready laid, one of the ranks has the word given to advance. For the ſake of order and regular work, the boy who is mounted on one of the horſes advances in a walk with the whole rank haltered or tied together, and enters on the bed of wheat, walking the horſes upon the track laid with wheat: another rank is ordered to follow, as ſoon as the firſt is ſuppoſed to have obtained a diſtance equal to a fourth part of the circumference of the bed: and ſo of the other ranks.

ranks. They are forbid to go out of a walk; till having walked upon the bed five or ſix rounds, word is given to move on in a ſober, ſlow trot, and to keep the ranks at their full diſtance from each other, as the four cardinal points of the compaſs. Regularity and deliberate movements are neceſſary, for preventing confuſion. The gentle trot is continued till the horſes have travelled eight or nine miles; which is their firſt journey, and then they are led off to be foddered, watered and reſted, while the trodden light ſtraw is taken off as deep as to where the ſheaves ſtill lie ſomewhat cloſe and but partially bruiſed: this is called the firſt ſtraw—or firſt journey.

As ſoon as this firſt ſtraw is off, one-third of the width of the bed is turned over on the other two-thirds from the inner ſide or circle of the bed; which narrows the track of the next journey. The horſes are again led on, and trot out their ſecond journey, till the ſtraw be again light and clear of wheat. It is then taken off, as deep as to what

what lies more cloſe. The horſes are again foddered, and allowed to reſt whilſt the outer third of the bed is turned upon the middle part of the bed. Then tread the bed a third journey, till enough. This ſtraw being taken off the whole remaining bed is turned up from the floor and ſhook out with forks and handles of rakes. The horſes tread this well, which finiſhes their journies; unleſs it be to run them a while on the chaff and wheat, the better to ſeparate them. The whole being now ſhoved up from the floor, with heads of rakes turned down, the wheat and chaff are put up into heaps on the floor, five or ſix on my great floor: and thus is finiſhed the day's work; in which moſt of the time is taken up in breaking the ſtacks, laying down the ſheaves, carrying off the ſtraw, turning and ſhaking the grain out from amongſt the ſtraw: and laſtly collecting the chaff and grain into ſecure heaps on the floor, which is alſo ſwept for ſaving ſcattered grains in ſeparate parcels to be

be next day cleaned ſeparately from the general maſſes of chaff and wheat.

The firſt journey is the longeſt and moſt laborious: but in the whole of the journies, the horſes travel but about twenty-five miles; and that is ſoberly, with frequent intervals of reſt and refreſhment. The heaps ought to be put up in a ſharp conical or ſugar loaf form, with more care than ſlovenly people allow them: the ſides even and free from hollows: and ſuffer none of the ſweepings to be thrown on the heaps. If rain falls on them, the wet edges next the floor ought to be ſhoveled up and thrown on the heap. It is better to clean and ſtore the wheat without thus expoſing it to rain: yet, through neceſſity, I have had a great heap of trodden wheat and chaff which yielded near nine hundred buſhels of clean wheat, expoſed in the open air above two weeks without damage, notwithſtanding ſome heavy rains fell on it. Now that I have a houſe at the treading floor, the wheat and chaff are ſhoved together into it, from

from being once fanned; and afterwards the wheat is well cleaned. As long as the weather was dry it was found beſt to continue treading till the whole crop was trod out.

I know of but three or four farms having houſes within the circle of treading floors. Mr. *Singleton's* invention is quite new. Four rows of ſtout locuſt poſts deep in the ground, form three lengthy diviſions; the ſpaces between them being ten feet. The middle part receives the ſtraw from the treading floor: the other two are for wintering cattle, which feed at pleaſure on the ſtraw, through rails let into the poſts, and which are moveable. The pitch is eight feet; and the whole building covered with thatch, is thirty feet wide, one hundred and twenty long, beſides circular ends, according to the ſhape of the treading floor, for holding chaff, &c. The width of the track, round this building, is about ſixteen feet; and the circumference of the floor or track is about 440 feet; of which 240 is nearly

nearly a ſtraight courſe, and 200 circular from rays of 30 feet. Some farmers have a barn cloſe to the eaſt, the ſouth or the north ſide of their treading floor. Two inſtances occur of treading *under ſhelter*: but their owners earneſtly wiſh their wheat, whilſt treading, expoſed to the ſun.

A neighbour, viewing the treading of wheat on my floor as above practiſed, ſaid the method is admirably eaſy to the horſes, and that moſt of the time is ſpent in taking off and carrying away the ſtraw: but he thought it would be a ſaving, if the outer half of the bed ſhould be trod till enough; and then ſhift the horſes on the inner half of the bed; and whilſt this is treading, the ſtraw to be carried off from the outer half, firſt trodden.

No. 1. plate The common way of driving horſes promiſcuouſly, incloſed by a fence; and two boys on horſeback following and driving them; in the preſent inſtance, along the outer part of the bed of wheat.

wheat. *In this way*, on a floor 90 feet diameter, I drove upwards of 30 horſes.

No. 2. My new method; with a barn in the middle; no fence, which would obſtruct the wind in paſſing to the horſes: the horſes led on in ranks quietly and orderly; and then ſteadily trotted round on the bed of wheat; at firſt as in the plate, on the outer half of the bed. Here my floor was 135 feet diameter; and the work better performed with 26 horſes.

No. 3. A barn and treading floor, propoſed, on the principles of Mr. Singleton's barn or cattle houſe and floor. *a a* Rooms, at the ends of the houſe, cloſed on all ſides, and floored, for thraſhing on, occaſionally, or for ſtoring wheat, chaff, &c.—2. 2. Stalls for cattle—3. Paſſage between the ſtalls, to feed from. The pitch from the ground, 8 feet—A floor above to be 10 or 12 feet pitch, for holding ſtraw, &c.—The dotted lines ſhew the track or bed of wheat in treading.

## *A Method of Registering Experiments.*

The following ſtatements are made partly on *previouſly deſigned* experiments; and partly from after thought *on reſults of field huſbandry.* This laſt is an eaſy way of collecting experiments, without the tediouſneſs common in conducting previouſly deſigned ones. The reſults of well regiſtered proceſs in cropping, often afford ſuch matter for ſtatements; eſpecially when there are comparative proceſſes. For inſtance, you have juſt now plowed in ſeed wheat, in beds or ridges, and obſerve the ground is left rough: what, you ſay, if it was to be now harrowed? But you determine on harrowing only every other bed or ridge, and obſerve the difference at harveſt: and whilſt the wheat is growing you will obſerve all particulars of it. You then regiſter the proceſs, the reſult, and ſtate the queſtion and anſwer; with what elſe occurs, in a note, thus:

*Experiments made in Maryland, in* 1785, 1786:*

## WHEAT SOWING.

### No. I. Ashfield.

*Process—September*, 1785.

Sowed the ſouth end on maize ground, after it was harrowed *flat*, under furrow; which formed *beds*. The reſt left gently rounded by harrowing, was alſo ſown under furrow; and left in moderate *ridges*.

*Result—July* 1786.

The *beds* gave plants equally ſtout from the very *edges*, quite acroſs them. The *ridges* gave plants inferior about the *edges*.

Queſtion—Are *ridges* or *beds* to be preferred?—*Beds* are by this trial. (A)



* This *method* of regiſtering experiments I learned from Mr. *Marſhal*. And the experiments here inſerted are from actual proceedings on my farm at Wye in Maryland.

(A) The maize had been thrice plowed *from* the plants, twice *to* them; which left the ground rather loweſt near the maize, and higheſt in the intervals. A harrowing immediately before ſowing did not quite level it. The wheat ſown on this and plowed in, and the water furrow or cloſing furrow being formed by a double mould-board plow dipt deep, left the wheat on flat *beds* of ſoil equally deep at the edges as in the middle: and the water furrow between bed and bed carried off redundant rain.—Other part of this maize ground, was twice plowed *from* and twice *to* the plants. This alſo laid the ground well, and the wheat grew nearly as ſtout on theſe low ridges (nearly beds) a very little raiſed above the water furrow, as on the above beds: except that ſome of the field, having the lands more raiſed, was formed into *ridges* which every where ſhewed weak wheat at their *edges*. My idea of beds and ridges is, where the lands are *rounded down on each ſide* to nothing at the water furrow, they are *ridges*: water drowns the edges, and the ſoil is there ſhallow:

ſhallow: but where the edges are *abrupt* (nearly upright like ſtrawberry beds) whether the lands are a *little* raiſed in the middle or are quite flat, they are beds, whoſe edges are raiſed above the water in the furrows, with a ſoil more equal in depth from edge acroſs to edge. The endeavour is to have the beds quite *flat*. In reaping *ridges*, on the right hand at entering, and on the left at going out, the reapers drop many heads of wheat, which are loſt: in reaping on *beds*, they cut evenly as the bed and its wheat range.

## WHEAT SOWING.

### No II. Midfield.

*Process*——*September* 1785.

Eight lands, each 250 yards long, 7 feet wide, were plowed into ridges, harrowed, ſowed and *harrowed in*: eight others *plowed in*: theſe were alternately repeated through ſeveral acres. The whole equally and

and highly cultivated to 5 plowings, 3 harrowings, and a rolling.

*Result——July* 1786.

All very fine: not the leaſt diſcoverable difference, on repeated cloſe inſpection by different people.

Queſtion——Is under furrow or over furrow beſt? Equal in this clean, mellow, ridged or raiſed ground. (A)

(A) With great prejudices againſt harrowed-in wheat, I was agreeably ſurpriſed to find this harrowed-in equal to the plowed-in; or over furrow equal to under furrow. Harrowing-in, is not uncommon in the peninſula of Cheſapeak (evidently uſed for diſpatch): but their fallows, ſo called, being twice rather ſlovenly plowed, are ſeeded in ſo foul and imperfect a ſtate, that harrowing in the ſeed proves greatly inferior to careful plowing in; from deficiency of preparative culture, as it ſeems. Their fallows are generally full of tufts and hard weeds,

weeds, which ſcratchings with plow or harrow cannot reduce. Even when ſuch ſtrong weeds are turned in together with the ſeed wheat, they keep the ground hollow; which is a diſadvantageous ſtate of the ground to a good wheat crop—there is a want of firmneſs—of compactneſs in the ſoil; from whence it is that even the richeſt ſand-land gives ſmall crops of wheat. But as rye yields well in light land, a *clay* ſoil would be the better, *for rye*, ſo kept hollow by the ſtrong weeds. My hope now is, from this experiment, it will be found in practice that clean, mellow, well tilled land (no ſeed ought to be on other) harrowing in will generally prove to be equal to plowing in wheat. If it ſhould not, yet I ſhould feel deteſtation in uſing that method of covering wheat, merely for the ſake of a ſhort cut. But it is ſaid, we have not time—have not force for *plowing* it in: alas! 'tis too true, whilſt we feel not the value of ſpirited exertion on critical occaſions, or aim more at riddance than perfection. That ſameneſs of motion we are uſed

uſed to indulge in, is much againſt ſtout crops.

## WHEAT SOWING.

### No. III. MIDFIELD.

*PROCESS*——*September* 1785.

South end, ſown in *broad flat lands*, and in *ridges* 7 feet wide (including water furrow) ſingle and double. A north and ſouth direction. The whole five times plowed, thrice harrowed and once rolled;—under furrow.

*RESULT*——*July* 1786.

The preference very ſtriking: my overſeer wondered at it. The ridges much better than the broad lands.

Queſtion——Are broad flat lands, or ridges preferable? Ridges are in this inſtance of a very level field. (A)

(A) The

(A) The ſoil, a good clay loam (wheat land) lying pretty dry and level. The ſingle raiſed ridges were on a part of the field which was rather lower than where the double ridges were: from whence, being wetter, the wheat in them was inferior to the latter. By ſingle and double ridges is meant raiſed ſo often by the plowings—increaſed in height, not in breadth.

## WHEAT SOWING.

### No. IV. MIDFIELD.

*PROCESS——September*, 1785.

Six acres ſown in ridges N. and S.—the reſt with moſt of Aſhfield, ſown in ridges and beds, E. and W.—Moſt of the ridges were ſingle: ſome double: a few triple.

*RESULT——July*, 1786.

The north ſides of the E. and W. ridges were univerſally inferior to the S. ſides. This difference was greater in the double ridges

ridges than in the ſingle; and very little wheat or ſtraw grew on the N. ſide of the triple ridges.

Queſtion—Are *ridges* in a N. and S. or E. and W. direction preferable? North and ſouth. (A)

(A) The *beds* ſcarcely ſhewed any difference between their N. and S. ſides. In ſome ſituations it may be neceſſary to ſow in an E. and W. direction; and then *beds*; not ridges ſhould eſpecially be made.

## ROLLING.

### No. V. SANFIELD.

*PROCESS—April*, 1786.

Fifteen acres in clover were rolled with a heavy roller, early in the month in a moiſt ſtate of the ground. Rains in May prevented mowing it till June. Soil a clay-loam.

*RESULT*

*Result—Auguſt*, 1786.

The growth from April continually inferior to clover in a near field, ſown and every way managed as this; except its not being rolled. The ſoils alike; and till the rolling, the growth of both was equal, and equally promiſing.

Queſtion—Is rolling clover in the *ſpring* advantageous? It is diſadvantageous, as ſeems from this compariſon, on a *moiſt* clay-loam.

## WHEAT SOWING.

### No. VI. Midfield—Ashfield.

*Process—September*, 1785.

Sown in ridges and beds, ſeven feet wide, inſtead of $5\frac{1}{2}$ as heretofore: 200 acres.

*Result*

*Result—July*, 1786.

The 200 acres were reaped in 12 days with 23 ſickles; with as much eaſe as the ſame hands and number of ſickles were uſed to reap them in 12 days on $5\frac{1}{2}$ feet ridges and beds.

Queſtion—Are fields ſown in $5\frac{1}{2}$ feet, lands, or 7 feet lands preferable, for reaping wheat? Equal, by this trial. (A)

(A) It was an agreeable ſurpriſe to find the field in ſeven feet lands was reaped and ſecured in as ſhort a time as formerly when in $5\frac{1}{2}$ feet lands; theſe narrow lands being eſteemed beſt with ſingle reapers. But a ſtrong and a weak hand joining to cut down the wheat of a broad land, performed it with great eaſe. Strong reapers cutting lands ſeparately from weak ones, often ſtop for them; whilſt the weak ones, hurrying to get up to the ſtrong, waſte wheat; but when they join to cut the ſame land, the ſtrong reaper readily takes the greater width

width of the land, and they keep together. By their more orderly proceeding, and not over reaching, as ſometimes on ſingle lands is the caſe, they avoid cutting off heads without ſtraw, where the ſickles enter or quit the ſides of the ridges. My wheat was now cut cleaner and better ſaved, with leſs hurry than uſual on ſingle or narrow lands. The reapers were men, women, boys and well grown girls. The beſt reaper and the worſt took a land; a ſecond beſt and worſt another land; then two middling hands a third land; from whence a ſteadineſs and evenneſs of work unuſual.

## WHEAT SOWING.

### No. VII. EASTFIELD.

*PROCESS—September*, 1786.

Sowed under furrow, rather wet; the ſoil left in clods. Every alternate four lands, each 7 feet wide, was harrowed after plowing in the wheat; the other four left unharrowed.

The

The reſult cannot be ſtated till after the harveſt of next year, 1787. At preſent November 1786, as in September and October, what was harrowed after plowing in, ſhews wheat of much the beſt appearance. The great fallow harrow proved too coarſe: the triangular maize harrow, with pointed or nearly chizzle teeth, performed well in two bouts to each ridge of ſeven feet width.

## *Thoughts on the Nature and Principles of Vegetation.**

The earth preſerves plants in their place: and contains water combined with particles of matter that promote their growth, and which the water conveys to the plants, at the ſame time that itſelf is a diluent to them. The earth and the atmoſphere, even in the drieſt ſeaſons, contain moiſture, which includes ſuch matter, however minute the parts and proportions. The ſoil, then, beſides

* The purport of anſwers I made to queries ſelected, from a paper of the Board of Agriculture, in London, and diſperſed amongſt my friends.

ſides ſupporting plants in their vertical or proper poſition, imparts water with its nutritive combinations to plants, as a food to them. The earth and the atmoſphere may be conſidered as magazines of the food of plants. The one gives it immediatly to the roots; the other to the leaves.

Different kinds of ſoil ſuit different plants: to which huſbandmen and gardeners are attentive, as a fact known from experience.

I know of no ſoil incapable of producing uſeful plants. We have a poor earth, a whitiſh clay, which though of a fine grain and not hard appears remarkably dry, at times when you would expect it ſhould ſhew conſiderable moiſture. Oaks and cheſnuts growing on it are all ſcrubs; but pines grow to ſome height and ſize. The pine tree has a noble tap root. There is alſo as bad an earth which contains much of a rotten ſtone or granules of an imperfect ore; and another hungry looking ſoil, called

ed black-jack land: it is ſandy, gravelly, or clayey, topt with a poor diminutive grey moſs. On this grow chiefly ſmall ſcrub oaks; and in a ſoil ſomething better, grow oak buſhes four or five feet high, loaded with acorns. Common clay I have known to grow ſtrong plants: in one inſtance dug up from two feet deep in the autumn, it was in the next ſpring ſown with melon ſeeds: in another inſtance, the clay was turned out from four feet depth in digging a cellar, and two years afterwards the hillocks, as formed in turning the clay out of barrows, were ſowed with melon, cucumber and cimblin or ſquaſh ſeeds. In both inſtances, eighty miles apart, the growth and duration of the plants were excellent. Probably the food to theſe plants, which have not much of a root, was nearly altogether from the atmoſphere.

When it is aſked if there are any plants which will grow perpetually in the ſame ſoil; and what are they? It may be anſwered, graſs will; and that hemp ſeems likely

likely to give perpetual, or at leaſt repeated crops for many years on the ſame ground a little manured. It is on the contrary a prevailing opinion that flax cannot be continued, crop after crop, on the ſame ground, with all the manure and culture that can be given it. But who has experienced it? I grew hemp twelve years on the ſame ground, two acres, without manuring in the time; and the failure was very little. The ground had been previouſly well manured; and it had a few intervals of reſt: only a year at a time. Maize and tobacco impoveriſh ground greatly: as it ſeems much from a clean cultivation expoſing the ſoil, freſh and freſh, to a powerfully exhaling ſun with but little of ſhade from April till September. But I have known ground cultivated conſtantly in tobacco, many years; being frequently manured.

Some plants receive moſt of their food at their roots, from the earth; and it may be ſome ſorts are received greedily by them, whilſt others are in part rejected. Other

plants ſucceeding theſe, receive it more at the leaves from the atmoſphere; or take at the roots, what was avoided by the former. The peculiar nature and fitneſs of food which different kinds of plants require, muſt be adapted to the abſorbing faculties, and the organization, or the mechaniſm and ſtructure of the veſſels of plants, by which they reſpectively receive and aſſimilate their nouriſhment. From whence it may be expected that ſoil tiring of ſome ſpecies of plants, will produce and promote the growth of ſome others vigorouſly.

Soil is exhauſted by certain plants depriving it of the vegetable food depoſited in it. Every crop in huſbandry takes ſome: and though the atmoſphere ſupplies the ground with more, yet it is ſeldom equal to what, in the ſame time, the plants take from the ground. Crops of grain often repeated, eſpecially cauſe the impoveriſhment or exhauſtion. Food of plants is gradually reſtored to the ground that has been exhauſted by ſevere cropping. Whilſt the ground

ground is ſuffered to reſt and ſettle into hardneſs, the acceſſion is very ſlow: the ground cannot readily drink in the moiſture lodged on it from the atmoſphere. Depoſited on the hard ground it is ſoon evaporated. When the ground is not trod cloſe by animals paſturing on it, it will continue ſomewhat open and mellow, for readily imbibing moiſture with its nouriſhing combinations. But by long reſting, ground gradually ſettles into a compactneſs, and the tread of beaſts adds greatly to its conſolidation.

In the extenſive country of the peninſula of Cheſapeak, there is no appearance of *calcarious* matter in the ſoil.* There indeed are on ſome of the banks of rivers, Indian collections of oyſter ſhells, cloſely confined to the edges of the banks. They are very little applied to the fields: and I know of but one inſtance of their being ſo

 applied.

* This is ſaid of its appearance, without any chemical examination having been made of the ſoil.

applied. The clays there, having the appearance of marl, that I have ſeen, do not effervéſce with acids. A great deal of gravelly and ſandy poor land, is within the peninſula: and there is much good wheat land, which yields the moſt perfect grain, preferred by millers for producing ſuperfine flour: and Engliſh peas, ſown early in the garden way, are every where a ſure crop. I know lands in Maryland which have been under crops, moſtly maize, upwards of an hundred years; and in the laſt forty or fifty years in maize and wheat, alternately, with one year of reſt, unſown: and though they ſhew no appearance of any *calcarious* matter, yet they yield perfect grain. Pool's Iſland I have known above fifty years; and it has been mine above thirty: in all which time it has been cultivated in two fields, alternately in maize and wheat. Its former proprietor who ſold to me, and other old people have aſſured me that maize with one year of reſt, had been the conſtant culture of it, till wheat near fifty years ago took place of the lay or

years

years of reſt; which introduced the courſe to be maize, and wheat; ſo that one field was in maize, the other in wheat, without any manure. All manure was applied to lots of tobacco, till tobacco was dropt about thirty years ago. The ſoil is a rich hazel loam on a good clay. I believe it has been cultivated above 120 years chiefly in maize and tobacco: and ſtill the preſent tenant procures ſure crops of perfect grain, much above the medium of the country in quantity and quality. His crops are maize and wheat alternately; yet the ſoil ſhews no appearance of *calcarious* matter.

Till lately I never heard that *calcarious* ſoils are more favourable to clover than other ſoils. At Wye in the peninſula of Cheſapeak, where there is no appearance of *calcarious* matter in the ground, clover thrives admirably well. I once ſowed there, on wheat which was ſown on maize, the ground having been many years cultivated in corns, without being ever manured, 70 acres with clover ſeed, which gave good

good paſture: but war prevented its being renewed. I had before been uſed to mow good clover from lots of dunged ground, on this Wye farm. It was intended to repeat ſowing clover ſeed, and extend it to all fields of winter grain; with the hope that the clover being plowed in together with the remains of the grain ſtubble, year after year, would gradually meliorate the ſoil. Gypſum did not anſwer as a manure (the farm being nearly ſurrounded by a ſalt water river). The fields were about 200 acres each: farm-yard manure not much; and a want of graſs was a want of live-ſtock, and of every thing proportionable to the ſize and quality of the farm.

Well plowed ſoils in general, and all mellow ſound ſoils retain moiſture a due time: but they ſhould have the faculty of readily imbibing moiſture, rather than of holding it long ſtagnant: every freſh acceſſion of moiſture brings with it an acceſſion of the combinations of water, as a food to plants: and it is better that the acceſſion be gradual

gradual and frequent, than ſeldom and in gluts. Cleaning and pulveriſing ſoil are means of its receiving and imbibing moiſture from the air. Manures add to the means: and ſome are eſpecially remarkable for attracting moiſture in the drieſt times, when moſt wanted. Gypſum duſt is noted for having this property; which therefore to the lands in America, diſtant from the ocean, gives great fertility. But in Britain ſurrounded by the ocean, and otherwiſe abounding in moiſture, it is ſaid to be of little efficacy. Attentive obſervers ſay, where the gypſum duſt is applied to plowed land, an actual moiſture is to be ſeen in the drieſt times.

There are ſandy ſoils in America, nearly barren for want of texture. Water paſſes rapidly through them, and manures have little to act on. Sandy ſoils are leſs adapted to manures of the warm fermenting kinds, than clay ſoils. Great rains long continued are more injurious to maize growing on ſand fields, than on clay or loam. They waſh

waſh and carry down all before them, and the dilution is exceſſive. Maize thrives better on ſandy ſoil in dry ſeaſons than wet ſeaſons: provided the plowings or horſe-hoings have been and are continued to be inceſſant in changing the ſurfaces of the ſoil, till the taſſel and ears ſhoot out. Droppings and remains of plants, as is experienced of the Magothy-bay bean, alſo green dreſſings from plants plowed in, improve ſandy ſoil. When it is ſaid, dung ſinks in ſandy ſoil, it may be better ſaid that having but little to act on, its effect is ſcarcely ſeen. Give the ſand tenacity and body, by adding to it a clay ſoil, and then dung it; even try virgin clay and ſand well dunged. I have ſeen hemp grown very high on a maſs of deep looſe ſand, near a tobacco houſe; and doubt not but that the richneſs in the ſand was in vegetable food accumulated chiefly from tobacco ſcraps; which are greatly adapted to drink in moiſture from the air. Tobacco abounds in vegetable ſalts. Manures which ferment are beſt for cloſe ſoils. Dung and clay ſoil meeting, effect much

good.

good. Green dreſſings from buckwheat, clover and the like, are advantageous in ſandy ſoils, as well as in ſtrong ſoils. It therefore ſeems they not only ferment and open the ground (beſt in clay ſoils) but alſo depoſit their ſalts and other vegetable matter, for attracting humidity from the air, and gently ſtimulating as well as actually feeding the plants, in ſand as well as in clay ſoil.

Soil is in the beſt ſtate for receiving ſeeds of plants, in ſpring and autumn; as being ſeaſons of temperate heat. The ground being clean and well pulveriſed, the ſeedſman is to follow and ſow cloſe after the plow or harrow on the freſh earth; and the ſeed is inſtantly covered, cloſe after the ſeedſman: beſt in the evening and morning. A fermentation of manures in the ground, at ſome times, and lively ſoils when ſuddenly warmed after winter, at other times, occaſion the ground to ſmoke, as it is called. The ſudden warmth dilates the ground and gives a ſpring to moiſture, which aſcends

cends from the earth more viſibly than in common. Rivers of ice and houſe tops alſo emit ſuch vapour at times of ſudden warmth and thaw.

The ſun evaporates a part of the humidity lodged on ground expoſed to it, before the moiſture can be ſoaked in. Shade defends it, againſt the ſun effecting a quick evaporation. Shade therefore gives the ground more time for drinking the moiſture in with its nouriſhing contents derived from the atmoſphere: and low plants probably emit an effluvium to the ground, of an ameliorating nature.* Sheltering ground, in ſummer or winter, ſeems better than wholly expoſing it to the ſun in ſummer or to froſt in winter. Temperate heat is probably beſt for the ſoil. I think but

* Exceſſive ſhade, ſuch as would ſmother plants, or deprive them altogether of the ſun, or of due light, or power to emit their effluvia and extend an atmoſphere of their own, or receive gentle and invigorating air, are not meant; but only a due ſhelter and defence againſt injury from *immoderate exhalation.*

but little of froſt as an improver of it. It indeed breaks clods: but the attentive farmer will not plow his ground too wet to occaſion them. Froſt is cold, and ſnow is cold; but ſnow prevents ſevere blaſts from ſweeping off the genial warmth of the ground, which with moiſture naturally aſcends to the ſurface of the earth. Moiſture is chiefly evaporated by the heat of the ſun in ſummer, and by keen winds in froſty weather.* Even ice is reduced by theſe winds. Pour water on the ſteps of the north ſide of your houſe, in a time of the ſevereſt freezing and windy weather: it quickly is formed into a ſheet of ice; which continually diminiſhes afterwards, and in ſome days will be ſwept off, according as the wind is more or leſs powerful. I do not believe that froſt or keen winter winds improve ſoils by an introduction of nitre. If ſuch weather improves ſoils, how rich ought to be the ſoils of the high latitudes!

* It is not meant but that the wind is alſo a powerful mean of evaporation in ſummer as well as winter.

tudes! There is it ſeems, at leaſt in weather free from ice, a continual aſcent and deſcent of moiſture with its combinations, vibrating from the earth to the atmoſphere, and from this again to the earth. Does ſevere froſt interrupt its rout or intercourſe? What then is the conſequence?—When ground ſheltered by a hollow fodder rick, during a froſty winter, October till April, proved for years more productive than where cattle were fed, in front of it, and there dropt their dung and urine,* was it becauſe of particles of rich moiſture ruſhing thither from all points, where being ſheltered from froſt and wind they were concentrated for future gradual diffuſion to plants? Here the ground, protected from keen winds and left open and mellow, is in condition for abſorbing nutriment in moiſture from all directions, unobſtructed by froſt, and unevaporated by ſun and wind. Or did effluvia from the fodder and corn-huſks within the rick or fodder-houſe,

* See of this, pa. 148.

houſe, effect the improvement of the ſoil? Or was it from both; at the ſame time that the tread of cattle hardened and untilled the ſoil which was unſheltered?

The common air gives neceſſary motion to plants; which with heat promotes digeſtion, and a degree of circulation within them conducive to their growth and perfection. Earth is not the food of plants; but together with the atmoſphere, it contains their food. Both are generally requiſite to the perfection of them. Soil receives from the atmoſphere, and it ſeems the atmoſphere from the ſoil, in a vibrating mode, the nouriſhment of plants; a due portion whereof, on its paſſages, is caught and conveyed to their roots and leaves. Heat cauſes evaporation, or promotes the aſcenſion of particles of moiſture from the earth to the atmoſphere. This aſcent of moiſture is moſtly in the day; as the deſcent of it is in the night, whilſt the heat of the air is diminiſhed: and ſo probably are the times of aſcent and deſcent of the juices

juices of plants, in a kind of circulation within them. The air, which is never quieſcent, glides along the ſurface of the ground, and commits to it particles of water with its combinations nutritive to plants, which it drinks in the readier and the deeper for the ground being pulveriſed and mellow. If the ground is cloſe and hard, what of theſe are lodged on it are not readily imbibed, but are ſoon evaporated. Of this I have obſerved inſtances in fields of maize. The well pulveriſed and frequently ſtirred maize field, ſhews moiſture on the ground till late in the morning, and never any drops or ſpangles of dew. The leſs ſtirred ground ſhews ſuch ſpangles early in the morning; but they are ſoon evaporated as the ſun advances, ſcarcely any of the dew having ſunk into the ground. I have viewed with admiration, in the drieſt ſummers, a clay-loam which had been *inceſſantly plowed* and harrowed, turned up by the plow with a fine colour, given it by moiſture. This earth had ſome adheſion of its particles and crumbled; for it was dry,

dry, in a duſt, only on the ſurface, a little way, and moiſt under that from dews continually abſorbed: and moreover, in the drieſt times, moiſture aſcends from the interior of the earth to its ſurface, and then to the atmoſphere. On the drieſt ſpot of earth, ſcrape a place level; and put a glaſs tumbler on it, bottom up. The glaſs will ſhew moiſture on its inner ſurface. Well pulveriſed ſoil will catch and abſorb much of the paſſing moiſture, for the benefit of plants, which otherwiſe would proceed directly to the atmoſphere.

Plants receiving a large portion of their nouriſhment immediately from the air, rather fertilize than impoveriſh ſoil, where they are not carried off from the ground, or ſuffered to run to ſeed. There are ſtrong marks of plants meliorating ground by their leaves and other offal dropt, and probably from their perſpiration; eſpecially of the pulſe kind. Grain and all ſeeds rob the earth more than bulbous or tap rooted fruit does.

Wheat

Wheat ought to have antipathy to the barberry buſh; becauſe for ſome diſtance round it wheat is uſually ruſted, although the reſt of the field be free from it. The barberry leaf and fruit are very acid. Is it an acid effluvium from the buſh that corrodes the wheat plant? If ſo, is ruſt or blight or mildew generally produced by means of acid or ſharp effluvia floating over entire fields of grain from other acid plants or corroding ſubſtances?

Under growing cheſnut trees, ſcarcely any plant thrives; nor under the red-oak. On the other hand the locuſt tree is an improver. Every thing thrives under it: the ground about it is better than what is not near it, evidently to the eye. The black walnut and the native black mulberry trees meliorate the ground: but none equal the locuſt tree; the pods and leaves whereof ſeem to have the effect that the humble annual plant called Magothy-bay bean has on ſandy ſoils. Ginſeng grows beſt, and is ſcarcely if at all to be found growing but in ſhady

ſhady grounds in cloſe foreſts: and this is the caſe with many other plants. I never ſaw any kind of ſnake-root grow but in the woods. Maiden-hair grows in ſhade, where the ſun ſcarcely ever ſhines. The moſſes delight in ſhade, under and on the north ſide of trees.

Plants on the ſea coaſt, when not greatly expoſed to bleak winds, thrive well. I have ſeen great growths of maize there, on very ſandy ſoil: and on the banks of the Cheſapeak, a wide ſea-water bay, the fields are thought to bear cropping better, and ſooner recover, than lands diſtant from the bay. All the old cultivated lands mentioned in page 276 are on the bay or ſalt-rivers.

Heat increaſes ſaccharine matter in plants and brings them to perfection. A ſmall field of maize was planted late. The Auguſt following was very wet and cool. There was little hope of the maize ripening. I ſhewed it to a ſenſible farmer, who adviſed me to let it grow merely for fodder. But having read of the blades of ſugar canes

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being ſometimes ſtripped off, in Antigua, for maturing the canes in wet cool weather, theſe maize plants were very early ſtripped of their blades, from the joint where the ears were peeping out down to the ground, for gaining more warmth from the ſun to the ground and plants. We were afterwards both ſurpriſed at the ripening of a good part of the corn. Maize-ſtalks abound in ſaccharine juice. Melaſſes and ſpirit have been produced from them, for domeſtic uſes.

The germ of many kinds of garden ſeeds periſhes when the ſeeds are ſown in a hot ſeaſon on a hot ground, although raked in. I alſo ſuſpect the germ of wheat is ſometimes injured when ſown early, as in Maryland, and left ſome time on the ground before it is covered. But clover ſeed ſtrewed in March or April on fields of wheat, or on barley ſown in the preceding autumn, or in the ſame March or April, never fails, although uncovered. I have generally ſowed ſo, in March; and it is the common

common practice in February, March or April. Thus leſs ſeed anſwers: all comes up: none is ſmothered under lumps of earth.

Farmers ſay, plants grow moſtly in the night. They obſerve it chiefly of maize; which at times has ſurpriſing ſtarts in growth.

Manure promotes the growth of plants, by its fermentation and warmth opening the ſoil for readily admitting humidity from the air with its nutritious contents; and for facilitating the extenſion of the tender ſhoots of roots: or by attracting moiſture with its combinations from the earth and atmoſphere: or by its depoſiting matter, that if not of itſelf nutritious to plants, at leaſt promotes the acceſs of ſuch as is nutritious to it. It is ſaid ground is ſometimes exhauſted by a ſtimulus from manures. The plant is a more likely ſubject of ſtimulation, as having life; and a ſtimulus to the plant may be a mean of promoting its growth. It alſo is ſaid, lime exhauſts land by its ſti-

mulus. It indeed has injured ground when applied in too great quantities; which tends to reduce ſoil, in ſome degree, to a mortar: and the cauſtic quality of lime when applied immoderately may, ſo will ſalt, deſtroy plants, and alſo a part of their nutrition depoſited in the ſoil. But in fact, it is nearly altogether repetitions of exhauſting crops taken from the ground which effect the miſchief. The farmer gives once, and takes for ever. If lime exhauſts ground by deſtroying the nutrition depoſited there, it muſt be without having promoted any growth in the plants. The injury done by lime, is ſaid to be from ſtimulating the ground, and with a kind of violence forcing it to yield great crops; whereby the ſoil is exhauſted: and indeed at length it is exhauſted—by the crops—not by the manure. It is better to give the ground a moderate portion of lime at a time, and apply it more frequently. In England, it is laid on to upwards of 300 buſhels an acre: in Pennſylvania to 100, as meaſured whilſt unſlacked; and ought to be renewed in

ſeven

ſeven or eight years. It ſometimes happens with lime and with gypſum, and even with dung, that after having performed wonders, they are ſo much thought of and ſo long depended on that the ſoil is cropped to death, and then it is ſaid, the manure, though at firſt ſucceſsful, has by its ſtimulation exhauſted the ground and left it ſteril: when in fact the numerous and ſevere crops exhauſted it—a common caſe. A farm in Maryland, reputed a poor place, was bought by a ſpirited farmer, whom I ſoon after viſited when his plows were breaking up its old lay, deep. It ſhewed a good wheat ſoil. The hiſtory of this eſtate is, that an Engliſh ſervant had procured extraordinary crops from it for ſeven years. His time out, he went off; and it was afterwards for many years cultivated by the maſter and his family in their own way. It then obtained the character of being a poor place; for that Engliſh John had worked its heart out by deep and much plowing. But the farmer who now bought it cheap, cultivated it boldly; and there-

by

by reſtored it to the good name it had in John's time.

Wheat ſtraw trod ſhort in getting out the grain, proved to be ſo conſiderable a manure, on my Wye farm, that wheat ſown after it, on the ground to which this ſtraw was given in April and *inſtantly* plowed in *muck wet* and *ſoft*, gave much of ſtraw with inferior grain; in ſome meaſure as if the ground had been over-dunged. From whence it ſeems that ſtraw *plowed in whilſt muck wet* from ſoaking rains that have *ſoftened* it, and in a time of due *warmth* in the air for fermentation is a conſiderable manure: when if it be plowed in under leſs favourable circumſtances, it is ſcarcely ſeen to effect any good.

The turf dikes to folds, uſed in Scotland, prove to be ſuch excellent manure, as to ſuggeſt the making trial of *coarſe hay and graſs mixed with good earth*, and heaped up together like the dikes, and ſheltering them from ſun and rain, as for making

ſalt

ſalt petre; but leaving the ſides open to receive the rich humidity of the air.

Farmers plow the grounds of their orchards; and take from them crops of potatoes, clover, or corns. They think it advantageous to the trees, to plow the ground about them frequently.

The earth is more thoroughly pulveriſed by the plow than the ſpade: provided that it is in condition to crumble before the mould-board.

The kinds of vermin and inſects in ſoil, which I have found hoſtile to plants are chiefly worms and ants; and in the air, flies and ſmall beetles of various kinds. Until about the year 1772, the moth-fly, deſcribed by Mr. *Duhamel*, was extremely numerous, common, and deſtructive in every year, to wheat after it was reaped. They did not affect plants. Although the taking notice of them in this place is foreign to the queſtion reſpecting only vegetation or plants,

plants, yet the damage done by them to wheat corn, was ſo immenſe and ſo conſtant for near twenty years, in Maryland, whilſt all attempts to avoid them were made in vain, the deſpondency ſo great, and the accidental diſcovery of the means of avoiding them ſo important, that the mentioning it, together with the following circumſtances cannot be here avoided. In that year, encouragement was held out, for the approaching new crop of wheat to be ſhipped immediately after harveſt. The farmers exerted their powers, and ſooner than till then was thought it could be done, trod out, ſold and delivered their wheat to the ſhippers, who were bold in this new experiment; which proved that wheat of this country, keeps well in ſhips, when carried to Europe on being ſhipped ſoon after it is reaped: and this getting out wheat immediately after harveſt, has continually proved to be a perfect ſecurity againſt the moth-fly, from that time to this. From the year 1773, I uſually trod out and ſold my crops of wheat in July or Auguſt, of the

the year when reaped. From 1785, in every year, on the third day that my reaping commenced, I began to draw in the wheat, and then alternately trod and drew it in, every day during harveſt. It was about the 19 of June when the reaping began: 24 horſes, ſix in each of four equidiſtant radii, gently trotting on the wheat ſheaves cut open, round a circle of near 400 feet, trod out near 200 buſhels a day, medium. One day 416 buſhels; the horſes driven hard, on a wager of the overſeer. Our wheat treads out eaſieſt in or ſoon after harveſt, before it has ſweated: and the ſeaſon is uſually then very dry. This *moth-fly* was ſcarcely known, but in the peninſula of Cheſapeak, and the lower country of Virginia and Carolina. The *Heſſian fly* is a new comer. It depoſits its nits or its eggs in the plant cloſe to the ground, whilſt growing. The young are there in the maggot ſtate, for ſome time ſtationary; and feeding on the tender blanched part of the ſtalk, wound and check the growth of the plant. Nothing is known to be

be done, at preſent, better againſt them than to give a vigorous growth to the plants, by manuring and cultivating the ground well; which admits of late ſowing: and this greatly checks their progreſs. A few years ago they abounded in the country near Philadelphia; excepting in the highly cultivated diſtrict of rich land below the city. There I could not diſcover the leaſt ſign of them in the growing wheat of a number of fields; at the ſame time that on the ſide of the city towards Germantown, where the ſoil is thinner and not ſo well cultivated, few plants were free from them in the only field that I there examined. We have alſo numbers of ſmall inſects popularly called louſe, flea, &c. which in autumn injure much of the young plants of wheat; like the fly on turnip plants, chiefly in dry weather. I never knew graſshoppers do any notable damage to wheat, but in one year; when, in Maryland, they ruined moſt of the fields of wheat, in autumn. It is ſtill called the graſshopper-year. I ſowed ſome ground twice, and ſome thrice over again. In

Maryland

Maryland is alſo a fly called, from its ſmell, *chinch-bug*; the ſmell being ſimilar to that of the chinch or bed-bug: and I ſuſpect that dropping its wings at times, it aſſumes ſomething of the character of certain ants, which are ſometimes with wings, at other times without them. The chinch-bug chiefly injures maize plants, by wounding them about the lower joints. It is not ſo generally miſchievous as the moth and Heſſian flies: but is it not nearly allied to the latter, which alſo, in the autumn *drops its wings where it alights to depoſit its eggs, as I am aſſured by a farmer of Cheſter county.*

## *NECESSARIES:*

*Beſt Product of Land: Beſt Staple of Commerce.*

In the winter, 1769, under this title, I wrote on the ſcheme, then agitated, for introducing into general practice in the then American colonies the culture of *ſilk* and *wine*. It was ſome time afterwards printed and diſperſed among my friends.

The

The philoſophers, rather than the politicians of America, with the beſt motives, endeavoured to induce the country people to apply their labour and attentions to the culture of *wine* and *ſilk*; as it ſeems, without conſidering they might therein be ſeconding the wiſhes of a jealous connexion, that we ſhould apply ourſelves to cultivating thoſe articles of luxury, rather than continue to depend on and cultivate the materials of bread; in which we then abounded as the firſt ſtaple of our commerce, and the firſt neceſſary of life: and it was thought to interfere with the Britiſh farmer, though groundleſsly; as Britain buys more bread than ſhe ſells, which has ſince been declared to the king of Great Britain by his council.

The *tobacco* colonies were already more dependent than the *bread* colonies: and it was obſervable that as the culture of *wheat*, and the manufacturing it into *flour* travelled ſouthward, from county to county through Maryland, the tobacco culture declined,

clined, and the people became more happy, and independent of the Britiſh ſtore keepers who had kept them in debt and dependent.

The perſons in America, who promoted the deſign of introducing the wine and ſilk culture, certainly did not conſider it as interfering with or tending to eat out the better ſtaple, bread: but it ſo forcibly ſtruck me with having this very miſchievous tendency that I could not withhold my opinion of it; eſpecially as it was countenanced by a number of inſtances in hiſtory; which I conſidered as being ſupported by the then actual ſtate of the wretched parts of Europe compared with the more happy countries of it—the ſouthern with the northern—the ſilk and wine countries with the bread and beer countries.

It is a principle of ſound prudence that whenever in matters of government, law, and commerce, any material alteration is propoſed, we ſhould beware of latent conſequences,

ſequences, and look forward and conſider, however flattering appearances are, what may be the miſchievous tendency of ſuch innovation when adopted. It is *better to drudge on in a temperate and middle ſtate*, than to aim at too much; and, "It is not "eaſy to determine upon theory the ſuc- "ceſs of political innovations."

The firſt great eſſential of life is *bread*. If America had adopted the ſcheme, it may be ſuppoſed that with her ſilk and wine ſhe alſo would have made ſome bread: ſo it is with the poor peaſants of ſouth Europe; but her labour and attention being diverted more eſpecially to raiſing the *luxuries*, which could neither properly feed or clothe her, ſhe has alas! only aimed at growing a ſcanty ſtock of grain, barely for family conſumption, and falling ſhort in that, becomes miſerably dependent on foreign countries for a ſupply from them.*

See

* Italy formerly exported corn; but afterwards became *dependent* on other countries for its daily bread. This is aſcribed by the Roman authors to the *neglect of*

See the condition of the ſouthern countries of Europe: all Italy, Spain, Portugal, a great part of France, and till lately that the cultivation of corn became the firſt object of the attention of its government, the whole of France, employing their chief labour and care in cultivating wine or ſilk: and though they are fine countries for yielding *wheat*, and ſome is cultivated in them, yet not aiming at *that* article *as a ſtaple*

*tillage*. Columal. Præf. Suæton. Aug. C. 42.——"The country about Voliſſo, in the iſland of Chio or Sciros, in the Archipelago, is very pleaſant, ſpacious and fruitful. The inhabitants raiſe 5000 weight of ſilk yearly; *with which they pay their tribute*. It is thought they lie under a curſe of being *always deſtitute of bread*." Thev. Trav.—The curſe is but the natural conſequence of their neglecting to cultivate a fruitful country in corn, for the ſake of raiſing the gew-gaw article ſilk. Had the tribute been reſerved in *corn*, their attention being thereby drawn eſpecially to that object, the curſe of wanting bread would never have fallen on them.

"The Druzees, in Syria, do not grow corn enough to ſupport themſelves three months in the year. They have no manufactures. All their exportations are confined to *ſilk* and *cottons*: the balance whereof exceeds very little, the *importation of corn*." Vol. Syr. vol. ii.

*ſtaple* of commerce, how conſtantly are they in want of, and how dearly do they pay ſtrangers for bread.*

In the war of 1744, France in the midſt of almoſt uninterrupted victories and conqueſts, whilſt her labour and attention were applied to the cultivation of wine and ſilk, was compelled to make peace and relinquiſh her conqueſts, merely from a *want of corn*; when her enemies had only the barren iſland of Cape Breton to give in exchange. Ever ſince that ſore-felt ſcarcity, it has been

* It may ſeem an odd poſition, ſays Mr. *Hume*, that the poverty of the common people of France, Spain, and Italy is in ſome meaſure owing to the ſuperior riches of the ſoil and happineſs of the climate: and yet there want not many reaſons to juſtify this paradox. The fine vineyards of Champaign and Burgundy are cultivated by peaſants who have ſcarce bread: but the farmers and graziers are in better circumſtances in theſe countries. *Hu. Eſſ.*

——Connecticut is valuable for *grain* and paſture. Any country is happy where the meaner people are plentifully and wholeſomely fed, and warmly and decently cloathed: thus it is in Connecticut. *Dougl. Sum.*

been her policy to encourage the cultivation of *corn*, in preference to all other articles of land produce: ſeeing and feeling, that however great and flouriſhing they may be in other reſpects, *bread being wanting, ſubmiſſion muſt follow.* This is an axiom applicable to individuals, as well as to nations.*

It is reckoned, by Mr. *Hume*, bad policy in Britain to obſtruct the uſe of French wines; when they ought rather to be encouraged in the application of their *labour*



* After the battle of Blenheim, the French army wanted a large ſupply of recruits; and there being a great ſcarcity of bread in the country, the French king ordered his public ſtores of bread to be well taken care of. The ſoldiers alone were well fed out of them, whilſt the country people were ſtarving; which occaſioned them through *neceſſity* to flock to the army, and inliſt in crowds. 2 Ha. Huſ. 338.——Here then we have an inſtance of the application of the axiom to *private* as the text is of a public *ſubmiſſion for want of bread.*——Mr. Hume ſays, "There "are many edicts of the French king, prohibiting the "planting new vineyards, and ordering thoſe lately "planted to be grubbed up: ſo ſenſible are they of the "ſuperior value of *corn over every other product.*"

*in making more wines*, by the free uſe of them in England; becauſe each new acre of vineyard planted in France, for ſupplying Britain with wine, would make it requiſite for the French to take the produce of a Britiſh acre ſown in wheat, in order to ſubſiſt themſelves: "and it is evident, "he adds, we have thereby got the com-"mand of the *better commodity*."

Intimations have alſo been thrown out, in America, encouraging the people with flattering proſpects of great wealth to them, would they employ their *attentions* in cultivating *ſilk*. So it was that the firſt *James* of England, attempted to infect the minds of the people of England. But it is an employment equally inconſiſtent with the genius of the Engliſh, as of the American people—a feminine buſineſs at leaſt.

The *ſilk* raiſed in *France* yielded ſuch an immenſe *apparent* profit, that king *James* repeatedly recommended from his throne, the raiſing *ſilk worms* in England: but the people

people fell not into his ſcheme, although perhaps more earneſtly preſſed by him and his ſervants, than moſt other matters—even by the *Judges* on the circuits, however foreign to their office; and there could be no doubt of the ſilk worm thriving and working as well in England as in other parts of Europe; as appeared from many experiments, beſides what are recorded in the tranſactions of their Philoſophical Society.

It was not many years ere that brilliant buſineſs began to decline rapidly, in *France;* where now it is quite trifling to what it then was: for, the "*profit* being *little elſe than apparent*, was not realiſed."

The people of England rejected the royal ſcheme for making them rich; the *employment* being ſuitable only to effeminate, ſpiritleſs, ſlow nations: and it is obſervable that, all the world over, the ſilk culture flouriſhes chiefly among people of that caſt; who are every where in a ſtate of miſerable oppreſſion or ſlavery. The very nature

of the *employment* tends to enervate that hardineſs and vigor, which is a general effect of manly labour and employment, and to effeminate the nation that ſhall ever ſtumble on it.*

But it is ſaid, *ſilk* would be *women's* work. Be it ſo: yet if our wives and daughters, were to raiſe as much *ſilk* as would purchaſe all the clothing and food wanted, the *men*, undoubtedly, would become idle and indifferent to other produce in quantities. The lands would be but little, if at all, cultivated or improved; and the *women* performing in a few weeks the buſineſs of *raiſing worms* and reeling ſilk, would become equally indolent for the reſt of the year. Both the men and the women would, in time, become ignorant of huſbandry and houſewifery. Nor could the *ſilk*

* "A large *ſilk work* has lately failed in France. "Experience convinces me of infinite difficulty in the "ſucceſs of ſuch a manufactory. The *filth* and *ſtench* of "the inſect are alſo diſguſting. I abandon the ſubject to "its native climates; for in houſes it is *intolerable to the* "*meaneſt peaſantry*." Letter to Mr. Young, in 1791. 17 An. 511.

*ſilk* more readily purchaſe what we ſhould want, than money would. If a mountain of *dollars* was open to all the people, with which they ſhould *purchaſe* what at preſent they labour in the fields to produce, can there be any difficulty in conceiving the wretchedneſs and dependency in which a country of people, ſo circumſtanced, would preſently be plunged? How totally ignorant the next generation, of agriculture, commerce and the arts! "The riches and "ſafety of a country conſiſt in the number "of its inhabitants *well employed.*"*

The people of Carolina, long ago, were to be made rich from the culture of *ſilk*, and they entered heartily on the buſineſs, under every encouragement; yet, in twenty-five years, they exported only 251 ℔ of raw ſilk, from their worms; and in the ſame time imported 40520 ℔, wrought; beſides what was mixed with other materials:

*A Table*

* "Near *Princeton* New-Jerſey, Anno 1794, are "large plantations of the mulberry tree, for the culture "of the *ſilk worm.* Some of the farmers greatly object "to them, as interfering with more uſeful domeſtic occu- "pations and encouraging *habits of idleneſs.*" Wanſey's Journal, pa. 193.

*A Table of* Raw Silk *exported from the* Carolinas *to* Britain, *in* 25 *years; from* 1731 *to* 1755: *and of* Wrought Silk, *alone, and mixt in Stuffs of the Manufacture of* Britain, *imported from thence into the* Carolinas, *within the same years:*

| YEARS. | *Imports.* Raw Silk. lb. | EXPORTS. Silk wrought. lb. | Silk with worsted. lb. | Silk with Inkle. lb. | Silk with Grogram. lb. |
|---|---|---|---|---|---|
| 1731 | — | 970 | 537 | — | — |
| 1732 | — | 774 | 892 | — | — |
| 1733 | — | 1015 | 1341 | — | — |
| 1734 | — | 943 | 937 | — | — |
| 1735 | — | 1487 | 864 | — | — |
| 1736 | — | 1223 | 516 | — | — |
| 1737 | — | 691 | 790 | — | — |
| 1738 | — | 1111 | 1177 | — | — |
| 1739 | — | 1273 | 877 | — | — |
| 1740 | — | 1454 | 1492 | — | — |
| 1741 | — | 2798 | 2452 | 440 | 7 |
| 1742 | 18½ | 1576 | 1350 | 144 | — |
| 1743 | — | 1427 | 1262 | 122 | — |
| 1744 | — | 1035 | 1296 | 181 | — |
| 1745 | — | 544 | 615 | 184 | 40 |
| 1746 | — | 929 | 590 | 330 | 3 |
| 1747 | — | 1313 | 2050 | 386 | — |
| 1748 | 52 | 1772 | 1658 | 155 | 34 |
| 1749 | 46 | 1772 | 1065 | 74 | — |
| 1750 | 118 | 1519 | 1258 | 223 | 50 |
| 1751 | — | 2404 | 1933 | 291 | — |
| 1752 | — | 3365 | 2860 | 218 | 7 |
| 1753 | 11 | 3027 | 2236 | 190 | — |
| 1754 | — | 2682 | 2300 | 374 | 150 |
| 1755 | 5½ | 3416 | 2634 | 337 | — |
| Total. 25 | 251 | 40520 | 34982 | 3669 | 291 |
| Medium per ann. | 10 | 1620 | 1400 | 146¾ | 1¼ |

This

This is taken from a ſtate of Carolina publiſhed by *Dodſley*, in London, in 1761; in which the author alſo ſays—" I cannot " help expreſſing my ſurpriſe and concern " to find there are annually imported into " this country (Carolina) conſiderable quan- " tities of Flanders lace, the fineſt Dutch " linens and French cambricks, chintzes, " hyſon tea, and other goods, ſilk, gold " and ſilver lace, &c. by which means we " are kept in low circumſtances; and " though it may have the appearance of be- " ing, for the preſent, beneficial to com- " merce, yet it retards our increaſe, both " in people and wealth."

It cannot be thought I mean we ſhould be wholly employed in cultivating *grain.* It is only wiſhed that we ſhould *not drop nor at all relax from cultivating the articles of life, to the greateſt extent;* that in a courſe of traffic we may *make luxuries and delicacies ſubſrevient* to them; and never let *neceſſaries* depend on *luxuries.* In raiſing all the neceſſaries, " *the better commodities*" for ſtaples of trade,

trade, that we can, a ſafe game is played; as we then have a moral certainty of our real wants being ever ſupplied; and there will always be a ſurpluſage of the neceſſaries to ſell or exchange with ſtrangers for their delicacies and luxuries, whereby our imaginary or artificial wants would alſo be gratified.

Nor need it be objected to the making *wine*, by perſons who may be diſpoſed to grow the grape and produce the wine for *family conſumption*; but not at all for ſale, leſt it be extended to exportation. Individuals will chooſe for themſelves, the application of their labor: but it is hoped that *legiſlators* and *men of influence* will rather diſcountenance than encourage the cultivation of articles of luxury, in quantities eſpecially.

It is not a great many years ſince *wheat* firſt became a conſiderable article of exportation in *Maryland*, and then in *Virginia*. Before which time, acts of the legiſlatures of

of Maryland and Virginia, were not unfrequent for prohibiting exportation of *Indian corn*, becauſe of a *ſcarcity* of it for anſwering the neceſſary wants of the country; and ſo inconſiderable was the quantity of *wheat* then ſown, that the prohibitory acts ſcarcely, if at all, ever mentioned *wheat*. As much *Indian corn* was cultivated as the planter deemed ſufficient for giving bread to his family, and food to his horſes and hogs. Some indeed aimed to raiſe it for exportation. *Wheat* was ſown in a lot or patch, for giving puddings, pies, and wheat bread on high days. *Tobacco* engaged the chief attention. The planter always aiming at making as much of it as he could. All *dung* was given to the tobacco ground. What of *maize corn* the planter could ſpare from family wants, was ſold for rum: the *tobacco* was partly conſigned, and the produce laid out as well in luxuries as neceſſaries; ſo that at the end of the year, if the planter was not left in debt, which he often was, he had little or nothing left but his land.

It was a ſtriking inſtance of *wheat* being the *better commodity*, that as the cultivation of it advanced into *Maryland*, and then *Virginia*, proceeding from our northern neighbours, the *demand* and of courſe the *price* increaſed: and as the culture of wheat progreſſed ſouthward, the country people became more improved in their ſentiments, manner of living, and independency of ſtore keepers, dealers in merchandize. Between *tobacco* and *hemp*, how great the contraſt! Tobacco a *luxury;* hemp a *neceſſary* in great demand. It is in every ſenſe the huſbandman and politician can conſider it, "*the better commodity*"—for private and for public advantage.

It however may happen in another century, that fine materials, and manufactured goods, will be articles of commerce from the interior country, far from navigation, rather than bulky, cheap, and heavy articles, becauſe of long land carriage; whilſt heavy, groſs, and cheap articles will be from the countries near enough to navigation;

gation; of which, *grain* is one as being too heavy, for its price, to bear a diſtant land carriage. Let us then continue to cultivate bulky *neceſſaries*, for the ſtaple of commerce. The more *bulky* the better; becauſe it employs more ſhips. *Wheat* is therefore better than ſilk, as alſo for the before mentioned reaſons. *Tobacco*, although a luxury, is better than the luxury fur: and *rice* is every way better than indigo.

Probably, the chief export of produce in the maritime country between Connecticut and James River, will be *flour:* of South Carolina, Georgia, and the Floridas, *rice:* North Carolina, *naval ſtores* and *maize:* Maſſachuſetts and other parts of New England, *fiſh*, *cattle* and *horſes:* Miſſiſſippi, *lumber*, *iron*, *hemp;* in ſhips built there, and never returning are ſold abroad.

It is ſaid that in all countries there are ſpots of land too poor for any other cultivation than of the vine; and that it is the caſe in America. I know of no ſuch ſoil in our America;

America; and believe there is no ſoil ſuitable to the vine that would not produce ſome more uſeful plant. There are indeed diſtricts of countries, abroad, poor and rocky, which produce delicious wines. They are in wine countries, where that culture has been ſomehow introduced, and then rivetted on the miſerable inhabitants, who moſtly want bread. There are other countries equally portioned with rocks and poverty of ſoil, in as good climates. Theſe produce no delicious wine—no wine at all, or none for exportation: but they yield the neceſſaries of life, particularly *bread*, abundantly; and it is a requiſite of comfort and conſolation.

Where of lands poor and rocky, only an acre can be cultivated to advantage, of better land clear of rocks, an hundred acres can be well cultivated, with leſs labor, in fields of grain. In the former, grain enough for a family cannot be obtained by culture. The proprietor of it therefore looks for a plant which will yield much of ſome-

ſomething from little land: and he pitches on the grape. But the vine requires manure; and the acre of grapes takes as much labor and attention as the hundred acres of wheat. If poor land is beſt for the vine, it is ſo only with the additions of manure and the higheſt cultivation. Cultivate poor land equally well, and look about for a plant of more value, at leaſt in point of uſe; *hemp*, *flax*, *cotton*. But why the vine? If employment is wanted, ſeek the better employment in the better land; and take example by the ſufferings of a great nation! If however you are poſitively impelled to grow the vine and make wine, yet be ſo conſiderate as not to lead others to follow you in ſuch barren ſoil, and ſuch inferior employment and purſuit. Rather adviſe them to beware of ſuch an experiment; that they may make all happy at *home* in an abundance of wholeſome food, and decent cloathing, with the aid of their placid wives and roſy children, cultivating or manufacturing *neceſſaries* within themſelves; and ſparing to ſtrangers the ſurpluſ-

age

age of their *grain*, their *wool*, and their *hemp*; *beſt commodities!* choiceſt materials of DOMESTIC AND NATIONAL EMPLOYMENT!*

## *FAMILY SALT.*

Many houſewives prefer *blown*, or fine white ſalt for all purpoſes; even for curing meat and fiſh. But their meat and fiſh are cured leſs perfectly than what the *Hollanders* and ſome other people ſalt and barrel up. In America, as far as I know, we make no attempt to cleanſe or refine the ſalt we uſe: and our meat and fiſh are rather dirty, and apt to become rancid and damaged.

The

* Bread and clothing, in ever ſo great plenty, cannot aſſure a permanency of enjoyments, but with the *means of defence* againſt plundering nations. The eſſential means of defence are *arms* and *ammunition*: theſe alſo are *neceſſaries*: and exportation of ſuch of them as are manufactured in the nation, ought to be encouraged, till they become one of the ſtaples of our commerce: for the more there are exported, the more will our nation abound in them; and the ſecurer will be our peace and independence. Peace is beſt preſerved by being *ready to repel*.

The people of *England* have been uſed to refine the ſalt wherewith they cure meat: but it is ſaid to be in an inferior degree. The *Dutch* people it is ſaid, are ſuperior to all others in the purity of the ſalt they uſe; and that their method of refining it is a ſecret among themſelves. How beautifully clean and well flavored is their meat and their fiſh in barrels! They are it is ſaid obliged, by *laws well obſerved*, to purify all the ſalt they apply to proviſions intended for exportation; and ſo are compelled to reap an advantage, in a *preference* at foreign markets; as well as incidentally to preſerve ſuch articles, in a *ſweeter, wholeſomer* condition for home conſumption.

The Dutch uſe *bay*-ſalt from Spain, Portugal, and France, after having made it very pure. Salt is produced, generally, by *evaporating* ſea water: and this is by means of the ſun and wind, or by boiling the water. The method by *ſun and wind* is *ſlow* and regular; which produces *bay*-ſalt, (on the ſides of bays or ponds) and the

the *ſpirit* of the ſalt is preſerved in a high degree. That by *fire* is *quick*, and gives *blown*-ſalt; which loſes much of its ſpirit by a *rapid* evaporation in *boiling* the ſea water. This *ſpirit* of the ſalt is eſſential for keeping proviſions; and when extracted and applied to pickle, gives an agreeable flavor: ſo that *bay*-ſalt, both as it has leſs of the *bad* ſubſtances, and more of the *ſpirit* of the ſalt, which is an eſſential of it, is preferable in its qualities to *blown* or boiled ſalt; beſides its greater weight in the buſhel.*

Lord *Dundonald's* method of refining ſea ſalt, (which he ſeems to have applied only to Britiſh blown ſalt) is ſimple and cheap. An account of it will be acceptable to the houſewives who are happily diſpoſed to have things perfect, and who would feel aſhamed to be behind their moſt active and ingenious neighbours in the perfect *neatneſs*

* The *ſpirit of ſea ſalt*, is of the nature of both the *vitriolic* and the *nitrous* acid. *Cavallo.*

*neatneſs and uſefulneſs* of their productions. With pleaſure they will ſee their ſalt purified from the foreign mixtures, which tend to *foul*, make *rancid*, *corrode* and corrupt meat. Beſides Lord Dundonald's method, for blown ſalt, given below, I venture to propoſe a trial of another mode, for coarſe bay-ſalt, and for thoſe who have not a conic veſſel and the means of conveying and *continuing* the *heat* through a flue: though it is doubtful whether for want of ſuch *continued heat*, it will prove to be effectual but with vaſt loſs, with blown or fine grained ſalt; when mere waſhing may ſuffice for large grained bay-ſalt.

### *Lord Dundonald's Method of Refining Common Salt.*

A veſſel of a conical figure, having a hole in the ſmall end, is placed near a fire: the large end uppermoſt. It is fixed ſo that it can be heated by a ſtove, with a flue round the veſſel. It is filled with ſalt; $\frac{1}{20}$ part whereof is taken out and diſſolved in water, juſt ſufficient to diſſolve it, in an iron

veſſel. This ſolution is made to boil, and is then poured on the ſurface of the ſalt, in the conic veſſel. The hot ſolution being already ſaturated, will diſſolve no more *ſea-ſalt*; but as it deſcends and filtrates through the ſalt in the veſſel, will *liquify and diſſolve the magneſia ſalita and magneſia vitriolata*, which drop out at the aperture of the veſſel, below. When it ceaſes to drop, take out another $\frac{1}{10}$ part of the ſalt in the veſſel, which diſſolve, and proceed as before: and repeat the like proceſs with freſh portions of ſalt taken out of the veſſel, until what ſalt remains be *pure as is required*. Three waſhings as above, render *Britiſh* made ſalt purer than *bay*-ſalt.*—Each operation

* So that whatever dirty appearances *bay*-ſalt has, more than Engliſh ſalt, it is ſo much purer from the corroſive nauſeous *bittern* and *ſlack*, that the *Britiſh* cleaner looking fine ſalt requires three purifications, for rendering it barely better than the *bay*-ſalt; although each operation purifies at a four-fold rate. How very inferior, then, is the *blown* ſalt for preſerving meat, in the ſtate we buy and uſe it, without being refined.—Had Lord Dundonald any other ſalt refined, or in his view, than *Britiſh blown-ſalt?* It ſeems as if barely waſhing *bay-ſalt* in water, will refine it of its *dirt*, and make it ſuperior to *blown-ſalt*

operation renders it $4\frac{1}{2}$ times purer than it was before. Its purity will increaſe in the following progreſſion: the firſt operation $4\frac{1}{2}$; the ſecond 20; the third 91; the fourth 410; and the fifth 1845 times. The ſuperior quality of the ſalt, thus freed from the *bitter*, *nauſeous*, *corroſive* ſalts and injurious *ſlack*, is he ſays obvious to the taſte as it is ſuperior in its elegance and goodneſs in preſerving fiſh, meat and butter. Newcaſtle ſalt, he adds, contains $\frac{1}{10}$ of its weight of thoſe bitter, putreſcible ſalts, which aid, inſtead of preventing putrefaction. A buſhel, 56lb, of *blown*-ſalt contains $5\frac{1}{2}$lb of thoſe bad ſalts and mixtures.†

Lord *Dundonald* refined 500 buſhels of ſalt at a time, in one large conical hopper, inverted.



three or four times refined as above. To give ſuperiority to this bay-ſalt, after waſhing it from *dirt*, it needs only *one* of Dundonald's refinings. Then how ſuperior would it be on three ſuch refinings! yet I doubt of there being any injurious ſubſtance attached to bay-ſalt than what is external, on the ſurface of the grains.

† See "Thoughts on the Manufacture and Trade of Salt;" by Dundonald in a pamphlet.

Country families would find it advantageous to refine their ſalt for a year's purpoſes at a time. October is a leiſure month, and ſalt is then cheap: but *Auguſt* might be preferable for preſerving *heat* to the ſalt in the hopper. Thus would be always at hand a conſiderably *pure* ſalt for curing fiſh, beef, pork, and butter. When the ſalt is refined and dried it is to be beat or ground down till *fine*, and kept cloſe from duſt.

When ſalt is applied in a *powder*, it inſtantly ſtrikes into the meat, effects its purpoſe, and goes further than if it was coarſe. Meat ought to be *ſtruck* with *powdered* ſalt, in the moment when it becomes cool; and not left as is common, for hours longer even in warm weather. Tendency to putrefaction ſoon commences; and long before it is diſcernible. Salting ſhould precede this tendency, and ſo prevent it; for ſalt cannot ſo effectually *ſtop* putrefaction, as it can *prevent* its commencement.

*A Method propoſed for Refining Salt, in Country Families, on Lord Dundonald's Principles.*

Make a hopper of four ſides, as for extracting ley. Of the quantity of ſalt put into it, diſſolve a twentieth part, in as much cold water as will juſt diſſolve it. The reſt of the ſalt, before it is put into the hopper, ſpread and make hot in a moderately heated oven or pot. Whilſt the oven is heating, the ſolution of the twentieth of ſalt is made to boil. Now place the *hot* ſalt in the hopper; and immediately pour the *boiling* ſolution over it. For a ſecond proceſs on the *ſame* ſalt, take out of the hopper another twentieth of the ſalt, about the time when the drippings of the firſt waſhing are nearly ceaſed; and as before, after diſſolving it in cold water and boiling this ſolution, pour it over the ſalt in the hopper: and, preſerving the heat well as you can, repeat it till enough refined.

All the ſalt procured from ſea water, before it is refined, contains a very acrid, corroſive

roſive and extremely injurious ſubſtance called *bittern*; ſo active, hot and ſearching it is, that caſks can ſcarcely be made to hold it; and alſo a magneſial ſubſtance called *ſlack*. They are ſo connected with the pure ſalt, and adhere to it with ſuch firmneſs that it is ſuppoſed they cannot be ſufficiently removed by common waſhings in water: at leaſt not without loſs of a part of the pure ſalt.

It ſeems that when common ſalt is ſlowly cryſtallizing, the grains are pure; and conſiſt of little elſe than the muriatic acid, a purging ſalt, and a trifle of magneſial earth, with fixed air: but when the ſalt is drawn out of the liquor where it was formed into grains there adheres to the ſurface of every grain, an injurious portion of *bittern* and of the magneſial earth called *ſlack*, and much *dirt*. It alſo ſeemed to me that waſhing off the extraneous ſubſtances, would leave the ſalt conſiderably purified. In conſequence of theſe reflections, I made the following experiment.

A box,

A box, open at each end, 3 feet deep, and 10 inches ſquare, had a ledge nailed on, within it and near the lower end: on which was placed a moveable frame covered with doubled coarſe open canvaſs, for keeping the ſalt. The ſalt was put on this. Upon the ſalt a like frame, covered with a ſingle piece of coarſe open canvaſs, was placed for receiving and ſpreading the ſpring water, which was then ſlowly poured on the canvaſs; the box being ſuſpended.

The quantity of ſalt was half a buſhel, weighing 39lb, in a moiſt ſtate. The firſt portion of water was two gallons, a quart pot full at a time; which carried down with it, dirt, bittern, &c. through the maſs of ſalt and lower canvaſs. The liquor fell into a tub, under the box, and was very dirty. Four hours afterwards, two more gallons of fair water were poured on the upper canvaſs; and the ſalt in the box was left all night to drain. It was then very clean and fair;

fair; weighing in its moiſt ſtate (after having been ſo waſhed) 28lb

Dried in an oven 25½

Moiſture evaporated 2½

But it is more agreeable to conſider it by the buſhel. Then, a buſhel of this ſalt would weigh, before it is waſhed, 78lb

—when dried, in an oven, before it is waſhed, 71

Moiſture evaporated 7lb

A buſhel *waſhed* and left *moiſt* 56lb. when *dry* 51lb pure.

—Inferior ſalt, from the waſhings, dry 15

——66, for uſe.

—dregs, dirt, bittern and ſlack; and thrown away in ſkimming 5

Total groſs dry ſalt 71lb.

71lb

71 lb dry; groſs.
66 dry; fit for uſe, after being waſh-
—— ed: of which 15 lb inferior.
5 lb, loſt in ſkimming, dregs, &c.

The 15 lb of ordinary, and much inferior ſalt, were recovered by boiling down the water which drained through the maſs of ſalt in the box, after it had ſtood to be clear.*

An

* The box uſed for waſhing the ſalt, had been applied to filtring malt-wort in brewing family beer. In one of which proceſſes, not thinking of ſuch an effect, I was ſurpriſed to ſee, on pouring fair water on the ſand in the box, the day after wort had been ſtrained through it, in order to waſh the ſand, that *the wort*, preſſed on by the column of water, ran off for a while quite *pure*; and then, all of a ſudden, the water followed, with ſcarcely any apparent mixture of the two fluids.——The uſe of this *ſand filtre* to wort, ſuggeſted the benefit that might be derived from ſome ſuch contrivance in purifying the ordinary water drunk in ſome parts of the country: and the fact, of horſes running on ſand iſlands on the coaſt of Maryland and Virginia and ſcooping holes in the beach on the ſea ſide, when the tide falls, and thereby procuring freſh water, led me to deſign a box of tubes vibrating in a ſpace of about ſix feet ſquare, ſo as to admit of 50 or 60 feet of filtration through ſand; thereby I hoped that freſh water might be obtained from ſea-water poured into a reſervoir, as a head, and paſſing 5½ feet down, then as many up, and ſo on to the end of the tubes; ſome-

An objection is made by country people to *bay*-ſalt, as being "too ſtrong." Strong of what? too ſtrong of ſalt? If a buſhel of *bay*-ſalt weighs 84lb, and a buſhel of *blown*-ſalt weighs but 56lb; and a buſhel of the *bay*-ſalt is applied to the ſame weight of meat, for which they find a buſhel of the *blown* is ſufficient, the former muſt then ſuperabound as 84 to 56: and thus it is that meat is ſometimes "*overſalted and hardened.*" If the large grained ſalt be ground down to the ſize of ſmaller ſalt, meaſure for meaſure will be nearer to an equality of ſubſtance, in both kinds of ſalt; but weight for weight will be ſtill nearer.

| | Cents. |
|---|---|
| 20 b. of *bay*-ſalt at 84lb.=1680lb. at 80 c. p. 84lb. or a buſh. | 1600 |
| 20 b. of *blown*-ſalt, 56lb.=1120, at 80 c. p. 56lb. or buſh. | 1600 |
| Difference 560, at 80 c. p. ditto | 800 |
| | 2400* |

So

what like the aſcent and deſcent of water, in ebbing and flowing of the tides, through the ſand on the ſea-ſhore: and if it ſhould fail of procuring freſh water from ſea-water, yet it would be an excellent filtring machine, for clarifying ſpring-water. Several attempts have been made by me to get ſuch a box made; as yet in vain.

* Two figures on the right hand, *in any ſum of cents*, being dotted off, all on the left are dollars.

So that 80 cents worth of *bay*-ſalt, performs as much as 120 cents worth of *blown* ſalt; and the latter, though it contains more of the bad ſubſtances, coſts 50 per cent more than the former, for making pickle. For *dry-ſalting* the coſt of grinding would be a trifle; which in pickling is ſaved.

It is ſaid by Lord Dundonald, that the diſſolved magneſial ſalts drop out: but what comes of the $\frac{1}{20}$ of ſalt in the ſolution? Is this $\frac{1}{20}$ attached to the general maſs of ſalt, whilſt the water of the ſolution carries down the magneſial dregs? If it is ſo attached, there is no waſte of the $\frac{1}{20}$ of diſſolved ſalt. Chemiſts countenance the ſuppoſition that the ſalt in the ſolution, attaches to the maſs of undiſſolved ſalt, whilſt the dregs continue united with the water, and are carried off by it.

Although the common rule for making pickle, that it ſhould *bear an egg*, may anſwer for ſome purpoſes, as where the thing

thing pickled is for early uſe, yet for making a *full and true pickle*, ſufficiently ſtrong for preſerving meat, fiſh and butter during a long voyage, it is preſumable that the ſolution ought to be *boiled* down till the ſalt begins to cryſtallize; which is diſcovered by a fine ſcum on the top of the liquid, whilſt it is ſtill over the fire. The water is then ſaturated with ſalt, and the pickle is perfect.

Freſh butter in balls, placed in kegs of brine *bearing an egg*, probably would not keep long: but, a brine ſo weak would admit of the predominant water rendering the butter rancid; and might even admit of maggots in it. But would this be the caſe of a true *full brine*, when a little of the ſalt cryſtallizing, ſhews it is at leaſt equal to the water? If balls or prints of freſh butter were barreled up with ſuch a pickle in tight kegs, perfectly tight againſt air, would not the butter keep a long while? And would it be without imbibing the brine? It however is known that the Hollanders

practiſe

practiſe a different method, with ſucceſs. A gentleman who formerly reſided in Madeira, ſometimes received from Amſterdam, preſents of butter, in very ſmall tight kegs filled in maſs; but without any ſalt or brine. Theſe little kegs were, each one, contained in a keg of ſtrong brine. On opening the little kegs, the butter was perfectly *freſh*, fine in *colour*, in *taſte*, and in *ſmell*: but if not ſoon uſed, it became inferior; as indeed would freſh butter made on the ſpot, on being expoſed to *air* and *heat*. This gentleman alſo received compliments in ſalted herrings of the coaſt of Norway, which were very fine. He obſerved that large grains of ſalt abounded among the herrings; and ſuppoſes they tend to preſerve the fiſh, from the cool nature of ſalt: but it is probable they were firſt ſtruck and cured with fine grained, perhaps powdered ſalt.

Butter is the better for having never been in *water*, or at all wetted, even in clearing it from butter-milk. If with *ſlow motion* for

for mixing it with very *pure fine ſalt*, and ſlowly preſſing out the butter-milk, the butter be never touched with water, but inſtead of cooling it with water, ice be placed round and under it, ſo however as not to wet it, and all this be done rather on a cold marble table, the butter may be expected to be greatly ſuperior, in *colour*, in *cloſeneſs*, and in *flavor*. But it ought not to be beat, nor even preſſed or ſqueezed with a *quick* motion. Every motion ought to be *ſlow*, in making butter. For getting out the butter-milk, ſprinkle it with very fine ſalt, and after gently mixing it in, let it ſtand awhile before the fluid is to be diſcharged. It is ſaid, there is no making fine paſte, but on *marble* tables; which are *cleaner*, *ſweeter* and *cooler* than any wooden tables; and that French paſtry cooks uſe *marble*. The reaſons are as ſtrong for nice *butter makers* uſing marble. A ſlab of *poliſhed marble*, on a ſtout oaken frame, may be firſt made cold with ice; and a drawer cloſe under the ſlab, filled with ice, would

would continue the cold, whilſt the butter is cleanſing.

It would be a fortunate circumſtance if houſewives, butter-makers and ſalters, were impreſſed with a warm conviction of the very important ſuperiority of the *Dutch refined ſalt*, over *our groſs impure ſalt*, and even over the *Britiſh refined* ſalt! the effect of which ſuperiority is ſtrikingly evident in the ſuperior condition of their barreled fiſh. I have compared Dutch ſalted herrings with Britiſh. The Britiſh herrings were fine and large: far ſuperior to the American; and were clean and well preſerved: but the ſuperiority of the Dutch herrings, though ſmaller than the Britiſh, was great in the *neatneſs*, and eſpecially in the *flavor*—Their fiſh, with the pickle, were a perfume.

## *RICE.*

The farmers in Jerſey, Pennſylvania, and Maryland, have for ſome years had ſuch

ſuch deſtruction in their crops of *wheat*, from the *Heſſian-fly*, that they now increaſe ſome crops and look about for other articles of crop to ſupply their loſſes in wheat. Some increaſe their maize culture; others rye. They might alſo increaſe or introduce barley, buckwheat, pulſe and hemp crops. As far north as Suſquehanna rice may be tried: perhaps further.

Sixty years ago, I experienced that rice grew to perfection in the dry ſandy ſoil of Annapolis; and a negro now living with me, has been uſed to grow rice on the loamy ſoil of South river, near Annapolis; the produce whereof was preferred by thoſe who bought of him by the quart, to the beſt imported rice. In 1781, in a clay loam on upland, in Talbot, Maryland, I grew a garden bed of it, drilled and hoed; the produce whereof was good in quality and quantity.

Mr. Romans, in his Florida, ſays rice will grow in any ſoil; though it loves watery

tery ſoil beſt: and that the reaſon of letting water on it is chiefly to ſuppreſs weeds. The time of planting, he ſays, is from the departure of froſt till the tenth of June; and that an acre will yield 16 to 1800lb, manufactured grain: a negro attending three acres very completely.

If rice be ſowed in rows, and horſehoed between the rows, why may not a labourer cultivate as many acres of rice as of wheat in rows? In rows the plants can be eaſily and effectually kept clean of weeds, and the ground light and mellow. The ſtalks of rice whilſt growing are ſo cloſe and hard that the Heſſian-fly could make no impreſſion on them.

Beſides rice, maize, and cotton, which will be continued the principal ſtaple produce of the lands in Carolina and Georgia, the climate there will admit of other products which cannot be matured in the field huſbandry of the northern ſtates; ſuch as will give freſh and dried exotic fruits, olives,

olive-oil, angola-pinder or ground-nut oil, (ſuperior to olive-oil, from an experiment I made in 1782) ſeſamum or benni-oil, cotton, &c.

## COUNTRY HABITATIONS.

Security againſt *fire* and *houſebreaking* is peculiarly deſerving of attention in building country habitations; detached as they are from the immediate aſſiſtance of neighbours.

In the time of the revolution war I loſt two houſes by fire, from accidents; and living on a navigable river, the houſe in which I then reſided was beſet in the night by a number of armed men. Their numbers could not be known, nor could they be repelled from within, otherwiſe than by firſt opening the door. They were let in upon terms. The houſe was badly conſtructed for defence; and I always diſliked the common mode of building with combuſtible materials without reſerve, eſpecially in the roofs. The annexed drawing of a plan

a plan and elevation may afford hints to perſons who would build in the country. It is not the intention to give a deſign to be particularly followed; but *principles* only, on which others may build to ſuit themſelves. The principles on which this plan is formed, afford many conveniences and much room; little being waſted in uſeleſs applications of the area, which divides, in various ways, very advantageouſly. The middle rooms muſt be very comfortable in ſummer, from being defended on the E. and W. ſides from the ſun ſhining on and heating the walls, and being aired by opening the S. and N. windows, and the partition doors occaſionally.

The floors of baſement ſtories in dwelling houſes, are wholeſomer and better when *ſolid* and of the common *earth* naked or laid with brick, ſtone, or cement, than floors laid upon joiſts over cellars or near the ground. Floors laid on joiſts near the ground or over cellars, confine a damp air under them long enough for becoming an

unelaſtic dead air; which producing a mouldineſs and ſmell of vaults, is mixed with the air of the rooms above, ſo as to be even ſmelt in ſome. Delicate people, uſed to dry warm houſes of the towns, ſeldom take a cold on ſleeping in log pens or houſes having *damp earthen floors*, when they travel in the frontier of the country.

Court houſes and other ſtone or brick buildings, having paved floors, and which are not airy, when ſhut up for ſome time, contain a ſomewhat ſtagnant unelaſtic damp air, which is alſo unwholeſome: but this is not at all the caſe of *inhabited*, *much-frequented*, or *airy* houſes with ſolid floors; when the air has ſome degree of current, and is all *alive*.

The floor of a baſement ſtory may be of brick or flag-ſtone upon the ground, raiſed a foot above the common ſurface. The ſecond or beſt ſtory to have its floor laid with rough ſtrong boards or planks, only three or four inches wide, nailed down acroſs

acroſs ſtrong ſtiff joiſts, and covered with a thick bed of a ſtrong cement, the colour whereof ſhould yield to utility.* Carpets may cover the whole. The waſh-boards and ſurbaſe may be of cut ſtone or marble. The floor of the third ſtory to be laid with thick narrow boards and cement as the firſt; but the waſh-boards to be of cement rounded off. Cellars to be under a detached building, or under the ſtaircaſe, or ſome one room of the principal houſe.

Wood is to be avoided as much as poſſible. The door and window frames may be of ſtone or iron, and the doors faced or lined with iron. The joiſts and boards for the platform roof and floors, alſo for the ſtaircaſe if this ſhould be of wood, are to be defended from contact of fire by cements. No outſide corniſh is requiſite to a platform roof.

Many

* Pieces between the joiſts ſtiffen them; and prevent lateral weakneſs and cracking of the cement.

Many houſes of the ancient civilized world had, and the Aſiatic and African houſes on the coaſt of the Mediterranean ſea, ſtill have platform roofs. The houſes in Algiers are ſo, and of one height; ſo that the ladies viſit from houſe to houſe and ſtreet to ſtreet, by walking on the roofs of the houſes. Platform roofs are cheaper than common ridge-roofs, ſhingled; and are ſafer againſt fire inſide and out, and againſt the preſſure of wind. Moſt houſes burnt in country places take fire in the roofs whilſt the family is gone on viſits or to church. Then it is that children or ſervants take candles or light-wood to rummage cloſets, cuddies, and cock-lofts, which uſually are lumbered with combuſtibles: or flakes of burning ſoot fall on the ſhingled roof.

A platform roof may be thus conſtructed. Joiſts 12 or 13 inches deep at the big end, are to reſt on the middle wall, and from thence ſlope two-tenths of an inch per foot to the ſmaller end on the exterior wall. Their

Their thickneſs $2\frac{5}{10}$ or three inches. The diſtance between them 12 or 14 inches, from centre to centre. Or the joiſts may be equally deep from end to end; and battens which ſlope are to be fixed on them, for forming the platform roof with the ſaid degree of ſlope. Between the joiſts, at every five or ſix feet, fix to them at right angles, pieces of plank, nearly the depth of the joiſts. Theſe would add to their ſtrength, as ſo many braces, preventing their weakneſs laterally.* Stout, rough, narrow boards, 3 or 4 inches broad, and a full inch thick, are nailed down acroſs the joiſts with large nails; the better if ragged. The ſun is powerful in drawing nails. On the boards lay a cement an inch or two thick, whilſt it is hot in ſlacking burnt powdered limeſtone one part, mixt with clean ſand and brick-duſt two parts. No more at a time is to be ſlacked than what the trowels can mix

* The joiſts of the floors are alſo to be ſtiffened or braced; for preventing their being ſhaken, ſo as to injure the cement of the floors.

mix and work up whilſt hot.* When the cement is dry, in a hot ſunſhine day, with a bruſh lay upon it hot *tar* three or four parts, and of *fiſh-oil* one part, well mixed together over a gentle fire. This coat may be repeated. Forbid walking on it for months after. Fiſh-oil corrects tar in its faculty of letting water through it; and the mixture gives a cloſe varniſh. After this, lay upon the cement tar and fiſh-oil boiled down together till they become *half-ſtuff*,† and ſift very coarſe ſand or ſmall pebbles over the whole. Over this lay more *half-ſtuff*, now without oil, and more pebbles without ſand.‡

The

* Doſſie. In ſlacking no more water is uſed than what will well wet through the heap of ſand: then to this add and mix up the unſlacked burnt limeſtone in powder; and be careful never to *drown* the maſs for a moment. This fault would be incurable.

† What in Maryland are called *inch-planks*, are *boards* in Pennſylvania. *Tar*, long boiled, produces *pitch*. When tar is but half boiled down, to a medium thickneſs, between tar and pitch, it is then called *half-ſtuff*.

‡ It may be tried by making a *bed of ſand and pebbles dry*, and then, levelling it, pour on hot tar (or the mix-

The method uſed for covering platform roofs in New-England, called there compoſition roofs, was lately given me; and is as follows. " Firſt boil a compoſition of *tar* and *pitch*, of about half made ſtuff; and let it boil well. Pay over the boards: lay down the *paper*, beginning at the eaves with a double courſe; always paying over the firſt before the next is laid on. Then lay the next courſe, about one-third to the weather, the ſame as ſhingling; and lap each joint on upon the other, about two inches; and ſo on till it is all papered over.

ture tar and oil) barely to ſoak through the bed. So it is, a gentleman of Carolina informed me he made beds of a ſandy ſoil, formed ſomething higher than the common level of the ground, for thraſhing out his rice crops. With gourds were gradually poured upon one of theſe beds, many barrels of hot tar. After a while the beds became like ſtone. Above fifty years ago, I was ſhewn the kitchen of a Captain Lux of Baltimore. It was a houſe which had been uſed for ſtoring barrels of tar. The floor was now a compoſition of tar and earth, and appeared like ſtone. I chiefly noticed the fire-place, which alſo was a compoſition of tar and earth, appearing like ſtone, and being quite incombuſtible. So on wharves are ſeen *old* ſpots, where tar had been ſpilt, which cannot be burnt.

over. Then pay it all over. Now take gravel, about the ſize of peas, or a little ſmaller, perfectly clear of loam. Put the gravel on about half an inch thick; and having ſtood two or three days, expoſed to the ſun, in the cool of the day ſweep what will come off in a heap; and then pay it all over again, and put on gravel as before. Then with a wooden roller three feet long and twelve inches diameter, roll it well in the heat of the day; always adding gravel as it may require. A ſtrip of lead half an inch broad is then nailed in the top of the eaves over all, to keep the wind from raiſing the paper. The compoſition is always to be put on boiling. The roof to have about two inches in three feet more nor leſs. The joiſts are not to be more than 18 or 20 inches from centre to centre. The boards are to be well jointed, and the joints well broke. When they are nailed down, dub off the joints fair and ſmooth."

Mr. Volney, in his Syria, ſays that that people make uſe of a cement thus: " whilſt the

the lime is *boiling* (according to the tranſlation—*ſlacking* I preſume) they mix with it one-third part of ſand, and another of aſhes and pounded brick-duſt. With ſuch a compoſition they form wells, ciſterns and vaults, which water cannot paſs through." I am informed this has been tried, from Mr. Volney's book, in the weſtern country; and that it anſwers on a platform roof there.

Mr. Latrobe permits me to give here the compoſition of a cement uſed by him, and the manner of applying it to platform roofs. "The floor muſt riſe about two or three inches in ten feet (two or three tenths of an inch in a foot.) Firſt, lay a floor upon the *rafters*,* of narrow well ſeaſoned plank cut

* On ſuch a flat roof are rafters requiſite or not? Joiſts without rafters may have the proper *ſlope*; without the aid of rafters for *that* purpoſe. But are not rafters better for receiving the unavoidable great weight or preſſure of ſnow and ice? They bear up againſt the preſſure, in ſome meaſure as an arch would: and the feet of the rafters place it all directly on the wall. Not ſo of joiſts receiving the weight.—Lengthy ſtraight pieces of timber

cut into ſlips not wider than four inches. 2dly. Lay down upon the floor with *boiling tar*, a coat of *ſheathing paper*, ſuch as is uſed for ſheathing ſhips. 3dly. One buſhel pounded chalk, or *unſlacked lime* or *lime ſlacked in the air*, or of *water ſlacked lime dried and pounded very fine*. Two buſhels *clean coarſe ſand*, and as much *tar* as is neceſſary to reduce it to a ſubſtance that will ſpread *toughly when hot*. The tar muſt be boiled and the materials *gradually* mixed with them till they are in a proper ſtate to lay on the paper. The ſtratum may be three quarters of an inch thick. Skreen *gravel*, ſo that the largeſt particles may be as big as large ſized peas, and none much leſs than ſwan ſhot. Take a *very hot day*, when the compoſition is

lying horizontally, ſwag with their own weight when they reſt with each end on a wall: and the great preſſure of weight bearing on them from end to end or wall to wall, is increaſed in proportion to their length or diſtance from the wall. Rafters are certainly requiſite where the diſtance is conſiderable and the beſt ſecurity is ſought. They ought not to be avoided for the ſake of ſo little coſt as they would occaſion. Indeed with rafters, the joiſts may be further apart, or a little ſmaller.

is ſomewhat ſoftened by the heat of the ſun, and with a garden roller, *roll* in as much of this gravel as it will take. The floor will then be a beautiful pavement, reſembling Scagliola, and may be worked in moſaique. This covering is ſo light, that very little timber is required in the roof."

A reſiſter of water for ſome purpoſes, is equal parts of *roſin*, *turpentine*, and *bees-wax*; which ſtands any heat not more than 140 degrees of Farenheit. Melt the ingredients together in a pot. When all the volatile oil, which cauſes the mixture to riſe is diſſipated, apply it hot with a bruſh. But it wants body for a roof.

In travelling from Philadelphia to Reading there is much of an earth having the caſt of red iron-ore, and it occurred that it might be the ſame as the reſiſter of water called Pozzolani: but I was not well enough to examine or view it otherwiſe than as I paſſed on. A factitious Pozzolani has been produced; which is ſaid to anſwer the purpo-

ſes

ſes of what is natural: and that it is cheap, and keeps well. In one hundred parts it contains 43 of *ſilice*, 35 of *iron*, 17 of *alum*, and a little of manganeſe. Iron, flint, and alum, the chief component parts of Pozzolani, are all found in the earths of America. When earth or clay on the ſide of a bank looks froſted or hoary, as a ſalt exuded from the ground, if taſted, it ſometimes proves to be an aluminous ſubſtance, which I have experienced on the banks of the Cheſapeak.

Objections readily occur to new projects; and it is right that they ſhould be well weighed and conſidered. It is ſaid platform-roofs may anſwer in ſouthern climates; but that in our more northern country, the weight of ſnow would be too great to be borne. This objection has the leſs force with me, who have had ſome experience on this head. I covered a houſe, thirty-ſix feet ſquare, with a flat roof which ſloped about a quarter of an inch to a foot. The joiſts of poplar were two feet apart; nine

nine inches deep at the upper end (the ridge of the roof) and about ſix and a half inches at the ſmall end, where they reſted on a wall. From the ridge to this wall was ten feet, and the joiſts from thence continued tapering further eight feet, where they reſted on a plate ſupported by brick pillars. Pine ſawed laths, inch thick, were nailed acroſs the joiſts. Common weak oyſter-ſhell mortar, from old Indian collections of ſhells, was laid on the laths, three-fourths of an inch thick. Tiles ſix quarters of an inch thick were bedded in the mortar. The joints were filled with tar and ſand; and the tiles and joints were covered and filled with half-ſtuff, on which ſand was ſtrewed thick and rolled. A guſt of wind carried off moſt of the ſand. Then again half-ſtuff and ſheathing paper were laid on; and upon the paper half-ſtuff, ſand and pebbles. Guſts of wind blew moſt of the paper off; and rain paſſed eaſily through. The paper remained on the roof over only one of the rooms; which was tight, excepting in one place, where rains poured through,

through, till a ſingle thin coat of *tar and fiſh-oil*, laid on hot with a hair bruſh, totally ſtopt the leak. This roof bore the ſnows of near twenty winters, in Maryland, without the leaſt attempt made to ſhovel off the ſnow. Mr. Latrobe's cement ſeems the beſt. It is tough, and cannot crack.

The leaking in this experiment was the more exceſſive, from the mortar being made of rotten ſhells; which made an imperfect cement: and moreover, too much was expected from tar and pitch, as reſiſters of water; when in fact they let it through rapidly; until mixed with fiſh-oil, which proved to be a perfect corrector: neither was the paper properly fixed; for it could not be nailed down. Though the joiſts were of a brittle wood, ſlender and diſtant from each other, yet the ſpan from wall to wall was but about nine feet.

In the annexed plan is a main partition wall, acroſs where the chimney is, from whence the joiſts extend 21 feet to the exterior

terior wall* The weight of extraordinary quantities of ſnow and ſleet often repeated in the courſe of a winter, is to be guarded againſt. If there was no chance of omiſſion to ſhovel off the ſnow every time it ſhould fall, leſs ſtrength would be requiſite: but there probably would be neglect in this; or the houſe might happen to be uninhabited during ſome winter or other; I would therefore have the joiſts ſtrong and numerous, and the joiſts immediately below thoſe of the roof, ſhould be made to bear ſome portion of the weight, by planks between the lower and upper joiſts; which are to be two or three feet apart, the depth of the ſpace allowed for the external air to paſs through and carry heat from under the platform roof, ſo as to cool the work and chambers, and admit a perſon to go be-



* In laying down joiſts, if a ſmall chip or cleat be nailed on, near their ends, it would greatly ſtengthen the walls; in holding them as a tie, and preventing their inclining either inward or outward. Short ſpurs of ſcantling may be fixed to the ſide of the joiſts next the wall, and extend into the wall with chips near their ends, for holding the ſide walls.

tween the platform and ceiling and examine defects.

Another objection is, that ſudden changes of the weather between great heats and torrents of cool rain, are very trying. But it is pretty certain that attention in the choice of the materials and laying on the covering will be effectual in preventing ſuch injuries; eſpecially when relieved from much heat by the vent between platform and ceiling.

The ſtair caſes in the above deſign may be beſt in the corner rooms, or the paſſages. To make theſe corner rooms otherwiſe than ſquare, would give them the appearance of an old caſtle, if rounded, and of a modern fortreſs if the extreme angles were made at all acute; which is to be avoided. It is in all things to ſupport the character of a houſe, a mere habitation. Wood on ſtair caſes may be coated over with a cement*.

Preſerving

*Nothing is ſaid of any uſe of the *flanks*, formed by the receſſes of the exterior walls: though holes in them would

Preſerving the principles, and the form; the ſize will be according to the ability and diſcreet views of the proprietor. In the annexed plan, the:

| | | *Feet.* | *Feet.* |
|---|---|---|---|
| 2 Paſſages are in the clear | 21 by 9 $\frac{5}{10}$ each | 200, both | 400 |
| 4 Rooms, the corners | 12 by 12 | 114 | 576 |
| 2 Ditto, . . | 20 by 21 | 420 | 840 |
| | | Whole area | 1816 |

The drawing is of an elevation and plan fronting ſouth. The entrance is at either of the ſides, eaſt or weſt: and theſe ſides need but little of window light. There are objections to balconies: but if deſired, the eaſt and weſt ſides of the houſe may be preferred, for giving ſhade; in the morning on the weſt, and in the evening on the eaſt. The width may be 2 $\frac{5}{10}$ feet of the receſs, and 5 $\frac{5}{10}$ projecting; making 8 feet the width of the balcony.



effect ſome good in airing the rooms. Among a civilized people, and in a *country of laws*, there *ought* to be no occaſion for any extraordinary application of them.

Between the ceiling of the uppermoſt ſtory and the platform roof, is to be a clear ſpace of two or three feet in depth, with holes through the oppoſite walls. The hot air will thus be carried off from the under part of the platform, and there will be a ſpace for examining the ſtate of the under part of the platform. The air holes in the walls may be 8 or 10 inches diameter, with wire or twine lattices well ſoaked in the tar and oil compoſition (in page 344), for excluding birds; and during the winter, inſide cloſe ſhutters are to exclude ſnow.

A baluſtrade of plain banniſters ſquaring to 2 by 3 inches, thin ſide outward, and leaving clear intervals of 6 or 7 inches, will admit of ſnow being more freely blown off as it falls: otherwiſe a handſome cloſe parapet of wall, would be preferable. Turned banniſters would not be ſo ſimply neat, nor admit of ſo much freedom to the ſnow being blown off, as theſe plain banniſters. Rope-netting or lattice would alſo admit of

ſnow

ſnow accumulating on the diagonal ropes and their angles.

| | | |
|---|---|---|
| Height: | Baſement elevation of the walls | 9+1=10 feet. |
| | Second ſtory, . | 12+1=13 |
| | Third ſtory, . . | 9+1=10 |
| | Vent ſpace, . . | 2+1= 3 |
| | Whole height | —36 |

In proportion as the walls are *high*, they ſhould be thick and ſtrong. The *three-ſtory* houſe would have 36 feet of wall above ground. A *two-ſtory*, 26 feet, and a *one-ſtory* houſe 15 feet. So that if one ſtory requires a wall 1 brick thick, two ſtories may have the baſement $1\frac{1}{2}$, and three ſtories 2 bricks thick: or ſay $1\frac{1}{2}$, 2, $2\frac{1}{2}$ bricks thick, the baſement or firſt ſtories. The foundation wall ſhould be three feet in the ground, for gaining firmneſs and to be out of the reach of ſevere froſt.

It may be ſufficient for ſome families, and beſt ſuit their purpoſes to have but *one* or *two* ſtories of rooms. The lower the walls the ſtronger. It would be no great taſk

taſk to force water up, every evening in ſummer, for cooling the roof and other purpoſes. At Algiers, much of the women's work is done on the roof, where water is always at hand. They eſpecially waſh and dry their linen there. In Spain, they have their cloacas on the platform roof; where alſo are two ciſterns of water: one for the uſe of the cook, the other for more common purpoſes, waſhing, &c.* From this the pipes of the cloacas are ſluiced. At Cadiz, water is received into the ciſterns on the tops of the houſes, from reſervoirs or heads of water on the hills out of the town. Water might be raiſed to a head at the top of Mr. Morris's quarry hill, on the Schuylkill, for ſupplying reſervoirs on the tops of the houſes in Philadelphia.† Conſult

* In Oporto the *kitchens* are uſually in the *attic ſtory*. Murphy's Trav. So it is ſaid, the kitchens are on the tops of many houſes in Spain: either on the platform roof; or more probably in the attic ſtories.

† With a quadrant level, I find that the upper part of the *brick* pedeſtal of Chriſt church ſteeple, is nearly level with the top of this hill: the obſervation taken at a ſtation diſtant from both objects: about two miles from the ſteeple.

Conſult ingenious men. The tide falling eight feet; and running $2\frac{5}{10}$ths miles in an hour, at leaſt equal to the walking of horſes in mill-work, could not works be ſo conſtructed that the impetus of the water of that river ſhould move a wheel (I think a horizontal one) which would force the water wanted up to a reſervoir on the top of that hill? A horizontal wheel under water would for ever turn one and the ſame way, whether the water runs ebbing or flowing; as near thirty years ago I experienced in a model.*

The

* From water forced up through pipes, every houſe might have *family baths* near the bed-rooms, which would be an important improvement for promoting the health and comfort of families. You now riſe from bed and waſh face and hands—your tip ends. Why not riſe and plunge into your waſh-baſon—a bath adjacent to your bedchamber, inſtead of uſing a gallon veſſel of water, only for hands and face? Every family in this climate ought to have its *bath*; and proper bathing places ſhould be provided for ſervants alſo.

Bathing moiſtens, ſoaks, waſhes, ſupples and refreſhes the whole body. When the water is *tepid*, bathing is always ſafe, cleaning and refreſhing; when *cold*, or made more than blood *warm*, it is wholeſome or not ac-

The *baſement* and *ſecond ſtories* may be divided according to the views of the builder, rather than by the annexed plan. The *third ſtory* having the four ſquare rooms, at the corners of the plan, thrown into cloſets about 2 $\frac{5}{10}$ths feet deep, will admit of the thin partition as above laid down, to be omitted; and then the whole area (clear of the cloſets propoſed) will divide into four roomy bed-chambers.

The

cording to the ſtate of health; but is very beneficial in many caſes, when well adviſed to uſe the one or the other, according to the ſtate of health.

" Among the rules for preſerving cleanlineſs and a " ſound ſtate of the ſkin, an important one is to *bathe* " *once a week the whole year through*, in tepid water: and " it is wiſhed ſays Mr. *Hufeland*, in Germany, that *public* " *baths* were again erected, that poor people might enjoy " this benefit and be rendered ſtrong and ſound; as was " the caſe in former centuries; when on every Sunday " evening, people went in proceſſion through the ſtreets, " beating on baſons, to remind the poorer claſſes of bath- " ing: and people who labored at dirty work, waſhed " off in the bath the dirt which, undiſturbed, would " have adhered to them probably their whole lives." 2. *Hufeland.*

The middle wall croſſing the paſſages and dividing the large rooms, will bear moſt of the weight on the roof, and muſt therefore be particularly ſtrong. The joiſts of the platform run from this wall north and ſouth to the exterior walls.

The receſſes of the walls are ſhallow as may be; $1\frac{5}{10}$ foot clear of wall will do. If *deep*, they retain or concentrate heat, and harbour muſketoes.

If the corner rooms be 10 feet ſq. or $100 \times 4 = 400$ feet,
The middle rooms 18 by 20 ft. ſq. or $360 \times 2 = 720$
The paſſages $7\frac{5}{10}$ by 25, or $187 \times 2 = 374$

Whole area 1494

Conſtruction of chimnies to the beſt advantage is very important; yet, till lately, the principles have been but little underſtood. Mr. Peale, of the Muſeum in Philadelphia, has given me ſome account of the fine effects of his patent improvements, and ſays, that "fire-places which were uſed "to ſmoke, on his principles are cured of "ſmoking;

" ſmoking; and ſuch entire command is " had of the draught of air, that with but " little of attention to the ſtate of the fire, " as to its burning clear or not, by moving " the ſliding mantle downward for increaſ- " ing the draught, then returning it for let- " ting the heat into the room, and cloſing " the valve in the throat of the chimney, " juſt far enough for carrying off the watery " particles of the fuel, only a ſmall portion " of the heat is ſuffered to eſcape up the " chimney: conſequently with very little " conſumption of fuel, even large rooms " may be kept comfortable in the coldeſt " ſeaſons, as during the laſt winter he con- " tinually experienced; and the houſe is " perfectly ſecure from any fire left in the " fire-place at night." I have in the late winter ſeen one of Mr. Peale's fire-places in its improved ſtate, where the room was uncommonly large, 26 by 25 feet ſquare and 15 feet high. On inquiry, it was aſcertained to me that during the winter only ſmall fires were kept burning from the morning about ſeven o'clock till nine or ten

at

at night, when it was let go down, and the family left the room to go to bed; that it preſerved a warmth, not leſs than 48 of Farenheit, in the room till the fire was renewed next morning; and this was the caſe in the coldeſt nights, when out of doors the thermometer was at 10 degrees. That in the day the heat was ſteadily kept at 60 degrees. There is, next door to mine, a fire-place very noted for ſmoking. After many vain attempts to cure it, it was cloſed up with brick-work, plaiſtered over, and ſo remained till lately, when Mr. Peale directed his improvements to be applied to it. Now it is perfectly free from ſmoking in the very worſt of winds and weather. What further proved to me the due portion of heat having been ſteadily preſerved in Mr. Peale's above room, during the winter, was the high perfection in which, in March, I ſaw in it a collection of green houſe-plants, oranges, &c. that had ſtood there the winter through. The room had two windows fronting weſterly, and two ſoutherly, and I never ſaw green houſe-plants more perfectly kept.

Ice

## *ICE HOUSES.*

Ice is applicable to economical purpoſes in hot weather, eſpecially in country families.*

In

* "I never was in better ſpirits than here in this "hot country (Sicily). I believe the quantities of ice "we eat, in ices, contribute to it; for I find, in a very "violent heat there is no ſuch cordial to the ſpirits as "ice, or a draught of iced water. Its cold *braces* the "ſtomach, and gives a new *tone to the fibres*. I knew an "Engliſh lady, at Nice, ſoon cured of a threatening "conſumption, by a free indulgence in the uſe of ices." —Probably attended with internal *bleeding*; which it is ſaid cucumbers, *cold* in their nature, have cured. "It "is the common practice here, Sicily, to give quantities "of ice waters to drink in inflammatory fevers." *Brydone*. But great caution is to be obſerved that it be not drunk, when you are *warmed* at all by any kind of motion: much leſs when you are in a *heat* from exerciſe.

"The cuſtom in Sicily and Italy of taking ice, is con- "ſidered as a powerful remedy in many diſeaſes. The "phyſicians of theſe countries do not give many medi- "cines; but frequently preſcribe a ſevere regimen; and "prevent the baneful effects of various diſeaſes, by ſuf- "fering the ſick, for ſeveral days, to take nothing but "water cooled by ice, ſweet oranges, and iced fruits." *Stolberg*.

In 1771, I built an ice-houſe in the peninſula of Cheſapeak, where the ground is flat and the ſurface only ſeventeen feet above the high water mark of a ſalt water river, and 80 yards from it. It was conſtructed with great care to prevent entrance of air, according to the then univerſal practice; and it was filled with 1700 ſolid feet of ice, the pit being 12 feet ſquare and 12 feet deep: but it failed of keeping the ice till ſummer, becauſe of its moiſture and cloſeneſs. When the pit was dug it ſhewed ſome appearance of moiſture near the bottom: the leaſt moiſture is too much for an ice-houſe. Moiſture at the ſides or bottom of an ice-pit, is raiſed to the inſide ſurface of the dome by a heat which, in the deepeſt pits that can be dug, is much above the freezing degree, and if the pit be cloſe it recoils on the ice for want of a vent. If the cloſe pit is not frequently opened it becomes very warm, and the ice is ſoft and pappy at the top. The deepeſt and cooleſt pits are about twenty degrees warmer than the freezing point: ſo that no depth

depth of a pit can preſerve ice from melting. It is from a greedineſs for depth that we too often meet with *damp* earth.

Some years afterwards, I made another ice-houſe, 150 yards from the above mentioned, on the principles and in the manner following: *vent* was an eſſential object; and *dryneſs* with *coolneſs* led me to the deſign of inſulating the maſs with a bed of ſtraw ſurrounding a pen of logs which was to contain the ice. The pit was dug on a ſpot open to wind and ſun, for the ſake of dryneſs. It was 9 feet deep. Within it was the pen of logs, of that depth, and 9 feet ſquare in the clear. It contained but a little more than 700 ſolid feet—only half the quantity ſtored in common ice-pits. A houſe was over the whole; rather for excluding rain than air. The ſides of the houſe were 5 or 6 feet high. The eaves were boarded up, but not cloſe, and the principal vent was at the top of a pavilion roof.

*Straw*

*Straw* is a conſiderable reſiſter or nonconductor of heat. Let it be clean, ſound and dry. Tread it down cloſe between the logs and bank. Lay an abundance of it upon the ice. The ſmall maſs of ice ſtored in the above inſulated pen, 700 feet, was daily uſed of very freely, and laſted near as long as double the quantity ſtored in a cloſe ice-pit as commonly conſtructed, and which is on the hill in Union ſtreet, Philadelphia; the earth, whereof is dry and gravelly from near the ſurface down to the bottom.

Below is a ſection, drawn of an inſulated ice-pit, differing from the one above mentioned only in ſize. The pen or cell inſide of the logs, is 12 feet ſquare, 10 feet deep, and contains 1440 ſolid feet. The ſpace between the logs and the bank, at bottom is one foot; the ſame at top is near three feet. The ſink for receiving water from the melting ice need be only 5 or 6 inches deep, and 7 or 8 feet ſquare. Logs are laid acroſs it. An ice-pit of 1400 ſolid feet,

if

if inſulated as above would keep more ice than any private family could want; ſuppoſing the pit is not deeper than 10 feet, and the ground is dry. A pit eleven feet ſquare and 10 deep contains 1200 feet. If this ſhould not be ſufficient, in another year heap on it a foot more in thickneſs: it will then be 1320 ſolid feet. Another foot makes 1440; and another foot; 1560. Theſe additions are above ground. Ice, in ice-houſes, melts more at the bottom and ſides than on the top; unleſs it may be otherwiſe in very cloſe pits ſeldom opened. A pen of 10 feet cube, and 3 feet height of ice added at the top, gives 1300 ſolid or cubic feet; and the houſe over it need be but 17 or 18 feet ſquare.

The winds moſt injurious to ice are from the *ſouth* to the *eaſt*. The door being on the *north* ſide, needs no paſſage. Rats are to be guarded againſt. The eaves are to be cloſed againſt them: but openings are to be left on the north ſide, at the eaves, for admitting the ſteam to paſs out, there

as

as well as at the common vent on the top of the roof. Theſe openings may be from lattice work in wood or wire: or a plank may be projected below the opening, and beyond the reach of rats.

All the building materials are to be on the ſpot, ready to be put up as ſoon as the pit is dug, leſt rain damage the pit before the houſe can be covered.

Beat the ice ſmall, and prefer to ſtore it in keen weather. In *ſuch weather* a neighbour daſhed water on the pounded ice, a pailful or two to each cart load, as ſoon as it was ſtored and pounded, load by load: and he informed me it anſwered well, in cloſing and cementing the maſs.

Ice beat ſmall and heaped on a floor of rough logs on a dry ſpot of ground ſloping every way, to the amount of 1200 ſolid feet, and then well covered with dry ſtraw, 6 or 8 feet thick over the ice, ſo as to exclude heat and rain from the ice——how would

it keep?——or how a maſs of ice half in the ground, half above ground, in a pen of logs built up and covered with ſtraw?†

INTIMA-

† January 1797. Viewed the ice houſe at the tavern, on Gloſter point near Philadelphia. It is built within a few ſteps on the north ſide of the tavern, and near the margin of a drained low meadow of ſome miles extent, and of the river Delaware; but a few feet higher than the meadow and river. It was dug 5 feet deep (ſeemingly 3 feet too deep). Then filled up 2 feet with logs, and ſtraw upon them; leaving 3 feet of ice under ground; and about 6 feet above ground, the ice incloſed in ſtraw; which alſo is a lining to the houſe of ſlabs, covered with a ſlight roof of boards. It was then full of ice, in pieces the ſize of apples. Sixty-one loads of a one horſe cart filled it. In the year preceding 27 ſuch loads ſupplied the tavern with ice till ſome time of Auguſt.

January 1798 I again ſaw this ice houſe; and was aſſured that the 61 loads kept through the ſummer, and that "ſome loads of ice were in it when ice came again." The only way into it is by a ſmall door, about $2\frac{1}{2}$ feet ſquare at the gable end into the roof.

# INTIMATIONS;

*On Manufactures;—on the Fruits of Agriculture;—and on New Sources of Trade, interfering with Products of the United States of America in Foreign Markets.*

The countries of Europe abounding in manufacturers and ſailors, and ſuperabounding in ſoldiers and miniſters of religion, buy bread from other countries; chiefly from *Poland*, *America* and *Barbary*; and, generally, the countries that ſell ſome, buy more than they ſell. The great bread country, *England*, buys more than ſhe ſells; and, at the ſame time, it is a happineſs to her that ſhe is ſuperior in the number and the excellency of her *manufacturers*; who, with her *ſailors*, are the more deſirable mere *conſumers* of bread, giving ſupport to a conſtant good market, *at home*, for the corn, the meat, the wool, and generally all the productions of her land; ſo that *England* abounds in the neceſſaries and comforts of life, within herſelf, from a well

proportioned employment of her farmers and tradeſmen, who mutually ſupply each other's wants: and ſhe furniſhes foreign countries with a prodigious overplus of the fruits of her manufactories and commerce; which has rendered her rich, powerful, and leſs dependent than other nations. The fifty or ſixty ſhip loads of wheat which ſhe buys more than ſhe ſells, are inconſiderable when compared with the great profits of her immenſe commerce and manufactures. The yearly buying more bread from abroad than ſhe ſells, aſſures to her huſbandmen a conſtant demand and full price for the corn produced by their lands; and this is a great encouragement to a vigorous cultivation of them; as it gives an income to the induſtrious countryman, independent of uncertain demand by foreign countries.

A ſtatute of the parliament of Great Britain, of no long ſtanding, compels the moſt minute entry to be made in the Britiſh cuſtom houſe, of every ſort of corn, as well what is imported as exported. The firſt report

report made to the parliament, under that ſtatute, was of the firſt eight years after it was in force; by which it appears, on a medium of the eight years, that there were *imported* into *England* about 600,000 buſhels of wheat, yearly, more than were exported—near 60 ſhip loads.*

*Poland* and *America* import no bread. For want of numerous manufacturers and ſailors, the moſt uſeful conſumers of bread, who make none, they have not a demand at home for one half of the produce of their lands: they therefore export great quantities; *America*, eſpecially, depending thereon for ſupplies of clothing and other comforts: which ſhe might ſoon, in a great meaſure, manufacture within herſelf. Ought

* This is here ſtated from memory. It is hoped it is not materially, if at all erroneous. That there is a deficiency of corn produced in the united nation of England and Scotland, we are aſſured by a ſubſequent report of a committee of the Lords of council to their king, on a bill then before the Parliament; in which it is declared, that "Great Britain is not able to ſupply itſelf with bread, without aid from other countries."

Ought ſhe not, therefore, to prefer it to a dependence altogether on foreign countries?

Somewhat has been ſaid, in public, of manufactories in *America;* whether it be adviſable to promote them in this early ſtage of her political exiſtence, or to depend on procuring them from other countries, with the produce merely of her own lands? Have we not "room for looms and the various arts?" Why then ſhould not this nation, in its preſent youthful vigor, begin to apportion her employment between huſbandry and manufactories? which in experience prove to be ſo coincident, ſo promotive of wealth and independence, as to have rendered *Britain* rich in all comforts, with a purſe powerful in war; but which ſome on both ſides of the Atlantic think has unwarily admitted of a degree of pride in her, that, according to what is common to that vice, bodes an approaching reverſe in the current of her affairs. Beſides, in the courſe of a great influx of emigrants to *America*,

*America*, many, if not the greater number, are mechanics. When theſe land on the ſea coaſt, and find little or no employment for them in the way of their profeſſion, will they generally go to country labour? Paſt experience ſays they will recroſs the Atlantic, or travel farther weſtward, and ſit down on lands eaſier obtained, and where they can live on leſs labor than they could among the old ſettlements in the hither country. But if manufactories were on foot among us, it would be natural that they ſhould generally prefer the employment they had been uſed to; and by ſitting down to their trades, they would gradually advance the arts in America, whilſt the more rapid increaſe of huſbandry would be the means of ſupplying them with bread in payment for their goods, and leave an overplus to be exported to foreign markets. "It however is material to the vigor and worth of manufactories, that they be not diſperſed." They are more or leſs advantageous, according as they are carried on in towns, or in detached habitations in the country. In general,

general, the manufacturer in the country has his farm, or a lot of ground, which divides his attention with that of his ſhop, whereby both crafts ſuffer; and certain it is, ſays Mr. *Young*, " their huſbandry is always execrable—the ſhop and the field are conducted with little ſpirit: both are mean in the quantity and the quality of the productions; and the living of the *farmer-tradeſman* is according to it. But in towns the trade is alone depended on, and the productions are more and better: ſo of the *thorough-farmer*, from whom he buys his bread, and to whom he ſells his goods."

When our employment ſhall be duly apportioned between huſbandry and manufactories, the comforts of life will be certain; as they will be procured within our country, independent of the caprice of foreign countries: with the overplus of theſe we are to obtain exotic delicacies, luxuries, and bullion.

" From

"From a well choſen employment are derived the riches, the ſtrength, the independency, and the happineſs of nations." If the employment be in things neceſſary and convenient, it is infinitely better than when applied in producing luxuries, With neceſſaries plentifully produced at home, we may be independent of other nations. An abſolute independency, which ſhuts out commercial and in effect ſocial intercourſe, is not meant. Nations do not all yield the ſame productions; and few, if any, properly divide their employment between huſbandry and manufactories. Britain is the neareſt to it. Even where the beſt proportion prevails, luxuries and trifles will have ſome ſhare of attention among the artiſts, although common ſenſe directs that, eſpecially for the intereſts of a young country, the firſt and principal application ſhould be to procure *neceſſaries* as well for *ſtaples of commerce* as for domeſtic uſes; ſuch as food, clothing, ammunition, &c. Yet legiſlators will not over buſily warp employment againſt its natural

natural bent. They may invite and gently incline it; avoiding dogmatical inhibition or command, unleſs it may be on very extraordinary national occaſions. Nor will they erect monopolies, directly or indirectly, or give undue preferences. Temporary patent rights for inventions are not meant.* To ſet about making *fine* goods before we are full of *neceſſary* comforts, ſeems a beginning at the wrong end.

The manufactures wiſhed to be firſt promoted are eſpecially of plain *clothing and blankets*, *arms and ammunition*. Manufactures of *woollen* goods are full in our view—In promoting theſe, we increaſe the quantity of meat and ſkins as well as wool. They are not exotic; but precious materials furniſhed by our huſbandmen. A bounty on the exportation of arms and ammunition *made within the nation*, would ſoon

* Perhaps it were better to grant *rewards* proportioned to the uſefulneſs of diſcoveries or inventions, than *excluſive* patent rights. There are conſiderable objections to the latter, in experience, however fair it ſtands in theory; and infinite advantages would ariſe from an immediate free uſe of the invention, at large.

ſoon cauſe thoſe eſſentials to abound in the country for its neceſſary defence. Yet it is in a ſpirited and *flouriſhing huſbandry that the ſoundeſt* health and comfort of nations is found. It is a *plenty* of food and clothing, that are plain and good, rather than fine things, which gives content and cheerfulneſs to a people; and it is the great maſs of the people that are induſtrious, rather than the idle poor or the luxurious few, who are principally conſidered by legiſlatures.

What if to the bread wanted by ſome countries, which is at preſent ſupplied by *Poland*, *America* and *Barbary*, one or two great additional ſources of it ſhould be opened? How would the huſbandry and the income of our country be affected by it? Would there not be then felt a want of manufacturers, conſumers of bread who make none, yet who would preſerve the value of the produce of our huſbandry by ſuch conſumption, and furniſh other neceſſaries and comforts from their various occupations? There is reaſon to believe that yet

yet a little while, and the productions of the countries on the *Nieper* and the *Danube* will ruſh through the *Straits of Conſtantinople* into the *Mediterranean*, and thence into all *Europe*. The wheat of the *Ukrain*, hitherto ſhut up by the *Turk*, ſells at 1*ſ.* to 2*ſ.* ſterling a buſhel. The countries ſo ſhut up alſo abound in cattle, hemp, tobacco, &c. which are to be conveyed through theſe ſtraits to a market new and important to thoſe countries; which articles will greatly interfere with and cheapen the produce of our country. The *Banat* is ſaid to be by far the cheapeſt country in *Europe*, in all neceſſary productions, meat, bread, wine, fruits, &c. The culture of *rice* was introduced there by the late Emperor with great and increaſing ſucceſs. Prices in the vicinity of *Tybiſcus* river are in ſterling, as follow:* wheat at 17*d.* an Engliſh buſhel; rye 12*d.* barley 7*d.*$\frac{1}{4}$; hay in towns, 10*ſ.* a ton;

* The Tybiſcus, or Teiſſe, is a large river, which takes its riſe in the Carpathian mountains; paſſes by Tockay through Hungary, and falls into the Danube above Belgrade. The Banat is the country of Temeſwaer.

a ton; in the country, 3*s.* a lean ox 40*s.* to 50*s.* a cow 30*s.* to 45*s.* (cattle are dearer than grain, becauſe they are readily driven to market: they are driven by thouſands annually, from the *Ukrain*, through *Poland* into *Sileſia* and *Germany*) mutton, 1*d.* a lb. beef, from 1*d.* to 1*d.*$\frac{1}{2}$; pork, 1*d.*$\frac{1}{2}$, to 2*d.* wine, 45 gallons new, in a good vintage, 7*s.* to 42*s.* according to quality; rent, 2*s*6 to 4*s.* the Engliſh acre; and all this cheapneſs we preſume is owing to the want of a paſſage through the ſtraits of Conſtantinople, to foreign markets—the very markets hitherto ſupplied by *Poland*, *America* and *Barbary*.† The *Turk* is to be forced by the *Czarina*

† "The clogs to the exportation of the produce of "*Hungary*, is an evil continually galling individuals. "Wherever I went (ſays Mr. *Townſon*) I was led into "cellars *full of wine*, and into granaries *full of corn*, and "I was ſhewn paſtures *full of cattle*. If I felicitated the "owners upon their rich ſtores, I heard one common "complaint—the *want of a market*, want of buyers. "Wine bought in *Hungary* for 133 cents, has an additi-"onal expenſe on it of 177 cents, in all 310 cents when "it reaches the port of *Trieſte*; and the corn bought for "44 cents, an expenſe of 133, both 177 cents at *Trieſte*. "The raw produce, unmanufactured, which *Hungary*

*Czarina* and the *Emperor* to ſuffer a paſſage through thoſe ſtraits: it already has been of late nearly accompliſhed.

You ſay the above events are problematical, or at a great diſtance of time: but there is one of a different nature and very influential in the argument which is more certain and nearer at hand. With the improvements in government, which the philoſophical ſpirit of modern times is producing, the condition of mankind will be bettered, and in no circumſtance will it be more perceptible than in their greater ſkill in all the arts, as well in agriculture as others. Then will *France* be fully equal, to ſupply her own demands for wheat, and *Spain* and *Portugal* will be ſo in no long time.

Another new ſource may be in *India*. Sugar has not become a common article from

" exports, are cattle, hogs, ſheep, goats, metals, mine-
" rals, flour, wheat, rye, oats, linen, woollen cloth,
" wine, wool, wax, potaſh, ſilk, ſtoneware, tobacco,
" flax, hemp, feathers, fiſh, ſkins, leather, furs, tallow,
" ſoap." The above ſums in *cents*, are the value of the ſterling money in the quoted paſſage.

from that quarter till lately. When in 1792, it ſold there 15*ſ.* or 18*ſ.* near four Spaniſh dollars a hundred, it was ſold 50*ſ.* to 60*ſ.* in London. A ſudden and till then unknown demand for ſugars by Europe and America occaſioned an increaſed price in India: and the demand having continued and increaſed, has ſtimulated the *Indoſtans* to increaſe the culture of ſugar canes with great ſpirit, for ſupplying *Europe* and *America* with ſugar. The *Calcutta* gazettes are full of the deſigns of planting and cultivating the ſugar cane: and now we are aſſured by ſome of our countrymen, who have been lately in India, that the *wheat* of that country is very fine, and is ſold at 11*d.* ſterling for an Engliſh buſhel. If then their ſugar makes a freight and a profit when carried to Europe, ſo may their *wheat;* provided it ſhould bear ſo long a voyage. It would ſell at above 500 per cent. when their ſugars would ſcarcely obtain 300. But will the bulk and price of wheat admit of a freight and profit ſufficient for the adventurer? Mr. *Law*, in his ſketckes of arrangements

rangements in *Bengal*, for the year 1789, ſays it would clear 50 per cent. "I ſaw, he ſays, much extended cultivation and increaſing population through *Bengal:* but there is ſome apprehenſion of a want of conſumption; grain ſelling in ſome places 100lb and upwards for 12*d.* ſterling, (equal to 7*d.* $\frac{1}{5}$ a buſhel of 60lb.) *Wheat* might certainly be exported from *Bengal* with great ſucceſs.—It would be ſhipped for 7*ſ*3 ſterling, the Engliſh quarter which is under 11*d.* a buſhel. At 58*ſ.* a quarter in London, it would yield 50 per cent. profit on coſt and charges of freight," &c.

Although wheat from India ſhould not always bear the voyage, yet the flour of it, which is very fine, might. Flour carried from the *Delaware* to the *Ganges*, proved perfectly good when *returned* from thence to *Philadelphia* in a late voyage. But if neither their wheat nor their flour could be carried to Europe in good condition, yet their *rice*, the common bread of the country, could. It uſually is very cheap; and whilſt

whilſt their labour is but 2*d.* a day, all the fruits of that labour will continue to be cheap.

Whether the great ſources of the countries on the *Nieper* and the *Danube* ſhall ſoon be opened or ſhall not, there is at preſent ſuch an apparent probability of it as may induce us farmers to conſider in time how we are to avert the threatened ill effects of a change that muſt be as ſudden as important. The farmer of flaſhy oſtentation may eſpecially think of retrenching waſteful habits: and whilſt legiſlators may wiſh that labour be apportioned between huſbandry and manufactories, and gently promote it, they will be cautious how they favour the one at the expenſe of the other.

In the *Ukrain* and *Poland*, and on the *Danube*, labour is cheap, whilſt with us it is the higheſt in the world. When we ſhall have driven the Indians from their country, what will be the condition of the

people of the hither ſtates, reſpecting labour which already is ſo much drained from them by the ultramontane country? This will not immediately affect all the ſtates; but it ſoon may, and who can ſay how ſoon it will not.

## POTATO SPIRIT; AND BEER.

What is called Iriſh-potato, as if derived from Ireland, was firſt found in *Peru;* and might therefore be more properly called *Peruvian-potato*, according to Mr. Romans: or globe-potato, from its ſhape.

Doctor Anderſon, of Scotland, gives an account of an extraordinary ſpirit which he procured from this potato.

In February he boiled to a ſoft pulpy ſtate, a buſhel of them, weighing 72lb: then bruiſed and paſſed them through a ſtraight riddle along with ſpring water, keeping the ſkins back, in the riddle, and throwing them away. Cold water was added

ed to the pulp, and mixed up till the whole mixture was 20 gallons. It ſtood till cooled to the temperature uſual for applying yeaſt to wort. Yeaſt was then mixed with it as if it was malt wort.

In 10 or 12 hours a fermentation began, and continued very briſkly 10 or 12 hours; and then began ſenſibly to abate. It was now *briſkly ſtirred*, and the fermentation was thereby renewed. The ſame operation, as often as the head fell, was renewed every day; and the fermentation continued for two weeks. It then abated, and could no how be further kept up. The liquor had by this time obtained a kind of acid ſlightly vinous taſte.

It was now diſtilled with due caution: care being taken to *ſtir* it in the ſtill, *until it began to boil*, before the head of the ſtill was put on; and the fire was afterwards kept up ſo ſtrong as to keep it *boiling briſkly*, till the whole was run over. This boiling prevented the thick matter from ſubſiding to the bottom, and being ſtill-burnt.

" In conſequence of theſe precautions " and due rectification I obtained, ſays " Mr. Anderſon, an Engliſh gallon of " pure ſpirit, conſiderably above proof, " and about a quart more of a weaker " kind, a good deal below proof. It was " in every reſpect the fineſt and moſt agree- " able vinous ſpirit I ever ſaw. It was " ſomewhat like very fine brandy: but was " milder, and had a kind of coolneſs on " the palate peculiar to itſelf. Its flavour " was ſtill more peculiar, and reſembled " brandy impregnated with the odour of " violets and raſpberries. A ſingle glaſs " of it put into a bowl of rum-punch gave " it a flavour of half rum, half brandy " impregnated with raſpberries. There " was no difference in the taſte of the very " weakeſt of its ſpirit, near the end of the " diſtilling and that of the firſt; which is " a great peculiarity."

The white pulp at the bottom of the ſtill is, he ſays, every way applicable to domeſtic uſes; for the table or for live-ſtock,

ſtock, as the whole potato is. But might it not, under ſome circumſtances, be better applied in producing ſtarch?

In the firſt week of *Auguſt* 1790, I made an experiment, according to Mr. Anderſon, for procuring potato ſpirit, from potatoes then gathered for the purpoſe, from vines not dead, but only beginning to be yellowiſh. But in ſeveral attempts could never get the maſh to ferment. The failure ſeemed owing to the potatoes being not *perfectly matured;* which is always an eſſential for obtaining a vinous fermentation. There alſo ſeems to be another reaſon for the failure. Mr. Anderſon made his experiment in *February;* a ſpring month, when doubtleſs his potatoes were conſiderably *ſprouted;* and ſo far were malted. Grain is purpoſely ſprouted, prior to fermenting it for making beer or for diſtillation; and in Maryland theſe potatoes ſpontaneouſly ſprout and grow in *February* and *March:* ſo that had I in either of theſe months chanced to have made the experiment,

ment, it would without doubt have ſucceeded.

Mr. Anderſon's candour and habits of accuracy are eminent; and leave no room to doubt that as he actually procured the fine ſpirit in the way above ſtated, the like may be again produced, by the like attentions.

I cannot expreſs my ſenſe of the ruinous habits in a free uſe of drinks made from diſtilled ſpirits; which are ſeen to debaſe and deſtroy very many men, and many good men on whom the practice has ſtolen. In country families they are uſed with a freedom aſtoniſhing to ſtrangers, who have been accuſtomed to obſerve a more temperate conduct, and are in the habit of drinking mild beer. In our large towns beer is taking place of diluted ſpirits; which is a reaſon why there is more ſobriety now obſerved in the towns than formerly, when Weſt India rum abounded at a third of its preſent price. Country people pretend they

they know neither how to get malt or to brew it. This is not generally true. Malt is to be had at country malt-works, in the more provident ſtates; and maltſters can eaſily be drawn into the counties of other ſtates, if country gentlemen would in good earneſt hold out proper encouragement.

It is better to buy malt, or exchange barley for malt, than to make it; and not every farmer has conveniency for making it with eaſe. The principal difficulty I found, was in the *heats* of the malt whilſt growing. Finding no one to inſtruct me, in many attempts I failed from giving too much heat: for, ſeeing it feeble in growth, it was thrown into more heat, and thereby ſtopt in its power of further vegetating. Till at length I ſucceeded, on applying the heats given by Mr. *Mills* in his Huſbandry.

In Mills's Huſbandry, vol. 5. are good inſtructions for making malt, and beer. The heats in the malt whilſt on the floor, were

were all that I wanted of him. Theſe he gives, thus: During the firſt ten days that the malt was on the floor, the heat in it was between 50 and 60 degrees. During the next three or four days, it was increaſed from 60 to 65 and 67 degrees; and during the laſt days of its lying there, to 80, 84 and 87, which laſt was the degree of heat when the malt was put on the kiln.

In country families the good wife would delight in brewing beer for her huſband, to take place of the mad, miſchief-making and, in the end, debilitating and ruinous brandy or ſpirit beverage. The truth is, drinking beer is not a faſhion of the country. Vile habits bear down all prudence and every rational practice that is recommended by the experienced ſober friends of mankind.

Whilſt ſpiritous liquors continue to be uſed in drink, the mildeſt and beſt ought to be preferred. Of theſe the potato ſpirit

ſeems

ſeems the leaſt *cauſtic* of any of the home made ſpirits. By drawing the ſpirit wanted from *potatoes*, the culture of that root is encouraged, *grain* is ſaved, and the beſt *preparation* of the ſoil for future crops is increaſed.

During moſt of the revolution war, my reapers had the choice of ſmall beer or water to drink, after an uninterrupted long uſe of rum. The beer had body enough to preſerve their ſtrength and a due ſhare of cheerfulneſs, without ever ſetting them wild, as had been not uncommon under the uſe of rum. At the end of harveſt there were no complaints of ſoreneſs and want of reſt: but they continued cheerful and eaſy, and expreſſed a preference in favour of beer. This beer was brewed, enough of it, juſt before harveſt. I never met with a ſervant, black or white, who did not like it; and for the moſt part, excepting confirmed ſots, prefer it to rum. Generally, when I have aſked poor travellers and meſſengers, whether they would have

have a drink of beer or a dram of rum, they preferred beer.

Our country is favourable to the production of hops: and they grow wild. It would be a good article to cultivate for the market, if labour was plenty for gathering entire fields of them. Hops are beſt cured by fire, as is tobacco; and like tobacco, when cured they become dry and friable, or moiſt and tough, with the changes in the atmoſphere: as they paſs from the moiſt ſtate to the dry, a portion of their active qualities is loſt in evaporation: therefore it is proper to pack them away, being thoroughly cured, the firſt time of their being "in caſe," as tobacco planters would call it: that is when they will bear preſſing in the hand, without being too dry or too moiſt or high in caſe.

I am not recommending hops as an article of crop for market, generally. But there are huſbandmen ſo circumſtanced that, to them, it would be a profitable choice.

Every

Every farmer, however, would do well to cultivate 50 to 100 hills of hops, for having at command an article ſo eſſential to the making good beer, when may hap he ſhall wiſh to introduce the moſt excellent beverage in his family: an article conducive to ſobriety, health, vigor and contentment. If however he meanly gives way to an impulſe that ſhall unfortunately continue him in the uſe of an unwholeſome, debilitating miſchief-making choice of diſtilled ſpirits in his drink, then his 50 to 100 hills produce of hops would annually put 15 to 20 dollars in his wife's pocket; who probably would have the care of thoſe few plants in her garden.

In England, great preference is given to a kind called *Farnham hop*. It is there a ſurer crop than other ſorts. The crop is not only always greater, but is of a quality that gains a conſiderably higher price than other kinds. This hop was introduced into Maryland by that pattern of manly virtues the late Mr. Sharp, when he was governor of

of Maryland. Some of the roots he gave me; and I planted of them 250 hills: and at the ſame time and place near 600 of a much admired hop, called the large white hop. The ſoil, againſt appearances, proved to be extremely unſuitable. The white hop in five or ſix years ſcarcely gave ten pounds, weight, a year. The Farnham, few as the plants were, gave five times as much. The plants of the former were always exceſſively ruſty or mildewed: thoſe of the latter were much leſs ſo, and ripened the fruit twelve days ſooner than the former. For preſerving the Farnham hop, not having land in Pennſylvania, when I removed to Philadelphia, Frederick Smyth, Eſq. was ſo obliging as to plant a row of them at Roxborough for me: but unluckily his ſervant placed them on the only poor ridge of ſoil in the incloſure. Mr. Smyth will diſtribute cuttings from them. Afterwards I bought *Como* and planted of them there; from whence cuttings can be had on application for them.

The

The following tripartite method of brewing is compared with the old or common method as follows.

*A Tripartite Method of Brewing.**

1. Water is put into the kettle, diviſion A. and heated.

2. The malt is ſpread in the diviſion B.

3. The hot water is pumped or poured over, from A. to C. where it ſpreads over a perforated bottom; and falling every where on the malt in B. waſhes out its ſubſtance, through another perforated bottom into A. The perforated bottoms are movable. This operation is repeated, with now and then ſtirring up the grains, and then, without ſtirring the grains, till the liquor is clear. The liquor is then made to boil briſkly, from hence it is let into coolers.

*The*

* Tripartite, becauſe the kettle apparatus is worked in three diviſions. A Swediſh method of brewing in camp, afforded me the hint for this invention.

*The old Method of Brewing.*

1. The kettle is filled with water; which is then heated.

2. The maſh vat is charged with malt.

3. The hot water is removed from the kettle to the maſh. It there remains ſome time, and then

4. The maſh is a long while ſtirred up with paddles: it ſtands ſome time afterwards, and then

5. The wort is let out very ſlowly into the underback or vat: a lengthy operation.

6. It is again returned to the kettle and boiled—and thence into coolers.

Mr. M'Cauley, in Front ſtreet, Philadelphia, made my tripartite copper with a pump; which ſee in plate fig.

## *DIET IN RURAL ECONOMY.*

Count *Rumford* has made many experiments on diet; and has written a book recommending the beſt choice for labourers. His book is not now in my poſſeſſion: but as Doctor *Lettſom* has ſince publiſhed on the ſame ſubject, below are a number of meſſes, ſelected from his book of "Hints deſigned to promote Beneficence, Temperance and Medical Science;" publiſhed in 1797.

Doctor Lettſom obſerves, in general, that *pies* are more advantageous than roaſting or boiling. This he illuſtrates. Of mutton, 64 ounces in a *pie* made with 24 ounces of wheat flour, and eaten with $8\frac{1}{4}$ ounces of bread, in all $96\frac{1}{4}$ ounces, dined 8 perſons fully; whilſt 60 ounces of mutton, *roaſted* and eaten with 33 ounces of bread, in all 93 ounces, dined only 5 of the ſame perſons.

1. Milk

1. Milk pottage (thickened milk) he ſays, is more ſalutary than tea and bread and butter; and made thus, is preferable to milk alone; equal quantities of milk and water, are boiled up with a little oatmeal; which breaks the viſcidity of the milk, and probably is eaſier digeſted than milk alone. Oatmeal is a warmer nouriſhment than wheat flour, and agrees with weak ſtomachs.

2. Of boiling potatoes he ſays, in Ireland and Lancaſhire potatoes are boiled to great perfection, and then are uſed inſtead of bread. The potatoes being good, are to be nearly all of the *ſame ſize*. The large and the ſmall to be boiled ſeparately. Waſh them clean, without paring or ſcraping. Put them in a pot with *cold* water; not ſo much as to cover them, becauſe they will add to the water from their own juices. If large, as ſoon as the boiling begins, throw in ſome *cold* water, and occaſionally repeat it, till they are boiled through to the centre: they will otherwiſe crack

crack and burſt on the outſide, whilſt the inſide will not be enough. Whilſt boiling add a little ſalt. The *ſlower* they are cooked the better. Pour off the water and place them again over the fire, for evaporating their moiſture, that they may become dry and mealy. Serve up with the ſkins on. Steaming them is very inferior to boiling or ſtewing in water, as above.

3. POTATO PUDDING. *Lettſom.*

12 ounces of potatoes, boiled, ſkinned and maſhed
1 do——ſuet
1 do——milk, that is, 2 ſpoonsful
1 do——cheeſe. Mix all together with *boiling* water to a due conſiſtence. Bake it. Inſtead of cheeſe, there may be an ounce of red-herring pounded fine in a mortar.

4. POTATO BREAD. *Parmentier.*

Cruſh and bruiſe potatoes well, together with prepared leaven (or yeaſt) and the

whole flour deſigned; ſo that $\frac{1}{2}$ be flour, $\frac{1}{2}$ potato. Knead all up with warm water added. When the dough is enough prepared, place it in the oven *leſs heated than uſual nor ſhut it up ſo ſoon* as is *common*; but *leave it longer in* the oven. Without theſe precautions, the *cruſt will be hard* and ſhort, while the *inſide will have too much moiſture*, and not be ſoaked. When potatoes are to be *mixed with dough of flour*, they are to be made into a glutinous paſte; for giving tenacity to the flour of grain. A ſmall portion of ground rice anſwers, and makes it eat ſhorter.

5. *Potato bread*, in England. A ſkillet of potatoes and *cold* water is hung at ſome diſtance over the fire, that the water may *not boil* till the potatoes become *ſoft*. Then ſkin, maſh and mix them with their weight of wheat flour, and alſo with the yeaſt, ſalt and warm water wanted. Knead all together. Lay the maſs a little while before a fire, to riſe; then bake in a *very hot* oven [Parmentier in the preceding

ing page is directly contrary]. Flour of rice or barley may be uſed inſtead of that from wheat.

6. Another Engliſh mode ſays: after long boiling, peel, ſelect the moſt mealy, and bruiſe the potatoes. To take off any bitterneſs of the yeaſt, a little bran, milk and ſalt are added; and after ſtanding an hour theſe are run through a hair ſieve.

7. Another mode is given by the *Board of Agriculture*.—It directs, to ſelect the moſt mealy ſort, and boil and ſkin them. Break and ſtrain 12lb potatoes through a very coarſe ſieve of hair, or a very fine one of wire, ſo as to reduce the pulp as near as poſſible to a flour. Mix this well with 20lb of wheaten flour. Make and ſet the dough of this mixture exactly as if the whole were wheat flour. This quantity makes 9 loaves of 5lb each, in dough; or when baked about two hours, 42lb of excellent bread.

Doctor *Fothergill* ſays, if potato bread is cut before it is a day old, it will not appear enough baked; becauſe of the potato moiſture [Parmentier's mode in the preceding page, cures this by baking ſlowly]. He adds, never ſlice potatoes with a knife, raw or boiled; but break and maſh with the hand or a ſpoon, otherwiſe they will not be ſoft.

Doctor *Lettſom* next proceeds to give the beſt ſoups; according to Mr. Juſtice *Colquhoun.*

## I. Potato Soup. *Colquhoun.*

Stew 5lb coarſeſt parts of beef or mutton, in 10 quarts of water till *half-done.* Add a quantity of potatoes, ſkinned, and ſome onions, pepper and ſalt. Stir frequently and boil enough. Bones of beef added would increaſe the ſoup in richneſs or quantity.

Eſtimate.

| | Cents. |
|---|---|
| Eſtimate. 5lb coarſe beef at 5 cents | 25 |
| Bones, to enrich it, | 5 |
| Potatoes 24lb or $\frac{1}{3}$ a buſhel | 8 |
| Onions, a bunch | 6 |
| Pepper and ſalt | 6 |
| | —50 |

It gives 10 quarts ſoup, meat and potatoes: and dines 10 men, at 5 cents. —A *red herring* is ſaid to be a good ſubſtitute for onions, pepper and ſalt. But red pepper may be added.*

## II. Barley Broth. *Colquhoun.*

It admits of a mixture of almoſt every kind of garden vegetable and is never out of

* An Engliſh gentleman aſſures me he often ate of a plain pottage or ſoup in Switzerland, which was very agreeable to him; and that having it made at his father's on his return to England, the family liked it ſo well that they often had it, though ſo plain and ſimple as to be made only of *potatoes ſkinned, boiled, maſhed up, and then ſtewed with ſome butter and ſalt;* without any potherbs or ſpice: and yet theſe were opulent people, uſed to good living. It is a good ſubſtitute for pea ſoup; and made of the ſame conſiſtence.

of ſeaſon. Onions or leeks and parſley are always a part of the ingredients: beſides which, cabbage or greens, turnips, carrots and peas may be added. A tea-cup of barley ſuffices for a large family. Pearl barley is dearer, yet not ſo good as the common huſked or Scotch dreſſed barley. Water 4 quarts, beef 4 pounds with bones, barley 4 ounces [Count Rumford ſays *barley-meal* is better than whole barley, for thickening broth, and making it more nouriſhing]. *Stew* all together two hours. Then add the herbs cut ſmall, and ſalt. The whole then boils till tender. Skim off the fat or not, as you like it. Onions or leeks muſt not be omitted.

III. *A plain good food, with very little meat; and as wholeſome as can be obtained from wheat or barley. Colquhoun.*

——Cut half a pound of beef, mutton, or pork, into ſmall pieces: add half a pint of peas, 3 ſliced turnips, and 3 potatoes, cut very ſmall: an onion or two, or leeks. Put to them ſeven pints of water, and boil the

the whole, gently, over a ſlow fire for 2½ hours. Thicken with a quarter pound of ground rice, and ⅛ pound of oat-meal (or ¼lb of oat-meal or barley-meal without rice). Boil ¼ hour after the thickening is put in; ſtirring it all the time. Then ſeaſon with ſalt and pepper, or ground ginger. As only a pint will be loſt in boiling, it is a meal for 4 perſons; and will coſt 2 cents each perſon.

IV. Cut into very ſmall bits, 2lb beef, mutton, or pork out of the tub; or hung beef, freſhened in water; and put them in a pot with 6 quarts water. Boil *ſlow* near three hours: or rather *ſtew* till tender. Add ¼lb carrots or parſnips, and ½lb turnips, all ſliced ſmall. Sometimes inſtead of them, a few potatoes ſliced: alſo add ſome greens, cabbage, cellery, ſpinach, parſley, and two ounces onions or leeks. Thicken with a pint of oat-meal (or a quart, to make it very thick). Boil all well together, and ſeaſon with pepper, or ground ginger and ſalt. It will ſerve a family

family of ſix, for a day. Or it may be thickened with any kind of meal; or barley, beans, peas or rice.

V. Take 4lb beef, onions ¾lb turnips 2lb rice 1½lb. Parſley, ſavory, thyme of each a large handful; pepper and ſalt: water 17 quarts. Cut the beef into ſlices, and after boiling it ſome time, mince it ſmall. The turnips and onions infuſed and ſweet herbs, may be minced before they go to the pot. Boil the whole *gently* together, about 3 hours on a *ſlow* fire. Scarcely two quarts will be waſted in boiling. The reſt will ſerve 18 perſons for one meal.

Where fuel is ſcarce, the materials in the three above receipts, may be ſtewed in a pot, all night in an oven; and will next day require but a quarter hour boiling.

VI. *Bake* in an earthen pot, a ſhank of beef in ſix quarts of water, with a pint of peas, a leek, and four or five turnips ſliced.

1. POTTAGES, by Col. *Paynter*.

Three pounds of the ſticking piece of beef, or a part of a ſhin, or any coarſe piece. Boil it in eleven quarts of water, two hours. Then add a pound Scotch barley, and boil it four hours more, in which time add potatoes ſix pounds, onions half a pound, and ſome parſley, thyme or ſavory, pepper and ſalt; with other vegetables, and half a pound of bacon may be added, the bacon cut into ſmall bits. It gives three gallons of pottage. Boil it over a *ſlow* fire, to be thick. It ſatisfied twenty ſoldiers, without bread; the nature of the food not requiring any. Col. Paynter adds that the men in the barracks liked it very much; and the officers introduced it into their meſs, and found it excellent. Its coſt would be 30 cents; or $1\frac{1}{2}$ cent a man.

2. *A*

2. *A preparative for Pottages. Paynter.*

It may be applied as above, or be eaten in meſs: an excellent diſh. A pound of Scotch barley is boiled, and draining the water from it, is ſet to cool in an earthen pan. A pound of bacon is boiled in two quarts of water. A few minutes before it is taken off the fire, put in the boiled barley, when it will immediately fall to pieces, being a jelly whilſt cold, and will ſuck up all the juices, of the bacon, nearly. The remaining water is then poured off. A few onions or leeks ſhould be boiled with the bacon and herbs. Seaſon with pepper and ſalt. A pound of Scotch barley *boiled four hours*, and cooled in a pan, becomes a ſort of jelly; which being put into boiling water, inſtantly falls to pieces. When the pound of barley is boiled, cooled, and coagulated, the coagulum weighs four pounds. This is an excellent nouriſhing food, ſeaſoned with ſugar; or made into a pottage.

Mr.

Mr. *Lettſom* then gives, from Doctor *Johnſon* of Haſlar hoſpital, a number of choſen meſſes; the reſult of experiments on diet, made at the inſtance of Admiral Waldgrave, in 1795.

I. A MESS, *according to Dr. Johnſon.*

Beef 1lb, potatoes 2lb, Scotch barley $\frac{1}{3}$lb, onions $\frac{1}{3}$lb, pepper and ſalt. Bacon 3 ounces. Coſt 10 cents. This, ſays Doctor Johnſon, would be a *dinner and ſupper* for three men; better than the common meſſes of fat bacon and cabbage, with which bread and beer are required. If one ſuch man eats *a pound of bacon* at nine pence ſterling for his dinner and ſupper, that article alone is equal to what might ſupport three men; independent of bread and beer.

II. MESS. *Johnſon.*

A ſheep's head, barley $\frac{1}{2}$lb, potatoes 3lb, onions $\frac{1}{2}$lb, pepper and ſalt, cabbage, turnips,

turnips, carrots. Water 11 pints. Coſt 16 cents. Produce 6 quarts. This was preferred to the other, in richneſs for flavor and taſte; owing to the *bones* in the head, which were broken ſmall before they were put in the ſtewpan. It makes a moſt comfortable dinner for four men.

III. MESS. *Johnſon.*

Bacon ½ lb, barley ½ lb, onions, pepper and ſalt. Coſt 9 cents. A dinner for three men, needing no bread.

IV. MESS. *Johnſon.*

An ox cheek, barley 1 lb, potatoes 6 lb, pepper and ſalt, onions 1 lb. Cabbage, turnips, carrots. Water 22 pints. Coſt 30 cents. Produce 3 gallons.

This coſts 30 cents, without bacon; and gives three gallons of very excellent pottage, for 8 men at dinner and ſupper (perhaps even for 10 men). It was rich, and

and better than my other pottages. Ox cheek ſeems to have the preference to the coarſe pieces of beef commonly choſen. ☞ *In all the above cookery*, ſays Mr. Johnſon, a *very cloſe ſtew-pan* was uſed, which emited *ſcarcely any evaporation:* a material circumſtance. He adds: Theſe diſhes are not meant to be continual; but to be three or four days in the week.

## V. Mess. *Johnſon.*

A ſhin of beef, barley 1 lb, onions 1 lb, potatoes 6 lb. Cabbage, carrots, turnips, ſalt and pepper. Water 11 quarts. Coſt 28 cents. Produce three gallons. Dinner for 7 men.

## VI. Mess. *Johnſon.*

Ox's head $\frac{1}{4}$. barley $\frac{1}{2}$ lb, onions $\frac{1}{2}$ lb, potatoes 3 lb. Cabbage, carrots, turnips. Salt and pepper. Water $5\frac{1}{2}$ quarts. Produce 6 quarts. Coſt 16 cents. A rich and

and high flavored pottage. In the laſt two above trials, the doctor omitted the bacon; becauſe the flavor of it, in ſome other inſtances, was too predominant; and it is a needleſs expenſe. On the whole of his trials, he found that ox cheek or ſhin beef are preferable to any pieces that are *without bones*.

## Pompion Diet. Doctor *Lettſom*.

The ſort common at the tables of the people of Maſſachuſetts, are diſtinguiſhed by the name of "*the winter, or long necked ſquaſh*." They weigh 10 to 15lb. This ſquaſh is boiled about half an hour: then maſhed up with flour or dough. They make "bread, puddings, and moſt excellent pancakes; by mixing certain proportions of this vegetable, previouſly boiled, with flour. But moſt commonly, they are eaten ſtewed, the ſkin being firſt taken off, and the entrails taken out. It is almoſt a ſtanding diſh at their tables; even amongſt the moſt opulent.

*General*

*General Cautions in Country Cookery.*

Soups are never to be filled up or have even a drop of water, hot nor cold, added: and are never to boil briſkly. They are to be long, long over the fire, *ſimmering* rather than boiling. And all ſoups having roots or herbs, are to have the meat laid on the bottom of the pan, with a good lump of butter. The herbs and roots being cut ſmall are laid on the meat. It is then *covered cloſe* and ſet on a *very ſlow fire*. This draws out all the virtue of the roots and herbs, and turns out a good *gravy*, with a fine *flavour*, from what it would be if the water was put in at firſt. When the gravy is almoſt dried up, *then* fill the pan with water: and when it begins to boil, take off the fat.—Never *boil* fiſh; but only *ſimmer*, till enough.—*Beef* quick boiled, is thereby hardened: *ſimmer* or ſlow boil it, in not too much water.—Veal and poultry are to be duſted with flour, and put into the kettle in *cold water*. Cover and boil

*ſlow*

*ſlow as poſſible*, ſkimming the water clean. It is the worſt of faults, to boil any meat faſt.—In baking pies, a *quick* oven *well cloſed*, prevents falling of the cruſt.

Waſteful or indolent people overlook calculation; and too many may think but little of the wholeſome and nouriſhing qualities of food. But here are well informed and moſt actively good men, recommending to the world the reſults of much inquiry and experience therein. However lightly may be thought of a cent on a ſingle meal of victuals, when the ſum of a year's meals is calculated, for a perſon, a family, and a nation, it becomes ſtriking and important. A cent for a meal, amounts to three cents a day.

| | Dol. |
|---|---|
| One perſon, at 3 cents a day, ſaves in the year . . . | 11 |
| One family of 5 perſons . . | 55 |
| A nation of 5 millions of people | 55,000,000 |

The

The cent thus ſaved by the good houſe-wife, on every *plentiful* meal of the *wholeſomeſt* food, would be ſufficient for maintaining the moſt deſperate war by the freemen of America, in defence of their country, againſt the WILES and the VIOLENCES of the great enlightened world!

## *GYPSUM MANURE.*

Mr. *Peters* wrote circular letters to ſeveral experienced farmers of Pennſylvania, containing queſtions on gypſum: to which they gave him anſwers: An epitome whereof, follows.*

Queſtion 1ſt. How long have you uſed the plaſter?

Anſwer, by Mr. *Weſt* 11 years
*Hannum* 12



* Mr. *Ciſt* has the pamphlet at large, for ſale; in which the anſwers are fully given, together with Mr. *Peters's* obſervations. And I have their permiſſion to publiſh this epitome.

| | |
|---|---|
| *Price* | 6 |
| *Hand* | 10 |
| *Curwen* | 10 |
| *Sellers* | 8 |
| *Duffield* | 13 |
| *Roberts* | 7 |
| *Peters* | 25 |

Queſtion 2d. In what ſtate was your land when you began the uſe of it?

Anſwer, by Mr. *Weſt:* tired down.

*Hannum:* Virgin ſoil and old land; good bad and indifferent.

*Price:* Worn out; but had been limed.

*Hand:* Exhauſted.

*Curwen:* Had been limed and dunged, after being exhauſted.

*Sellers:* Poor.

*Duffield:* Had been in poor timothy.

*Peters:* Worn out.

Queſtion

Queſtion 3d. What quantity per acre have you generally uſed?

Anſwer, by Mr. *Weſt:* $4\frac{1}{2}$ to 3 buſhels
*Hannum:* 1 to 5
*Price:* 1 to 2
*Hand:* 3 to 4
*Curwen:* 1 began with 6 and ſunk to 1.
*Sellers:* $2\frac{1}{2}$ began with 4 or 5
*Duffield:* 3 to 5 if ſandy 3. If loamy more.
*Roberts:* $1\frac{3}{4}$ to 4
*Peters:* 3.

Queſtion 4th. What ſoils are the moſt proper for this manure?

Anſ. by Mr. *Weſt:* Warm, kind, loamy.
*Hannum:* High ground, and ſandy ſoils.
*Price:* High, warm, dry, gravelly or loamy.
*Curwen:* Dry loam; better on hilly than level land.

*Sellers:* Too light and ſandy or clay are unfavourable: loam is beſt.

*Duffield:* Sandy or light loam.

*Roberts:* The ſame; and watered meadows. (Sloping is meant.)

*Peters:* Light dry and ſandy or loamy.

Queſtion 5th. Have you repeated the application of it with or without plowing? At what intervals, and with what effect?

Anſ. by Mr. *Weſt.* They have a good effect. It follows lime equal to any manure.

*Hannum.* With and without plowing, with very good effect.

*Price.* The like anſwer, with many inſtances of good effects.

*Hand.* With good effect; though with leſs at the laſt.

*Curwen.* On meadow and clover every other year, with good effect.

*Sellers.* Suſpects the good effects will be leſs on a frequent application, as of any other manure often repeated.

Improvement

Improvement of land may be ſimilar to that of animal improvement, which is better promoted by a change of nutriment, than by being confined to any one kind.

*Duffield.* Good on graſs every 3d or 4th year, without plowing: on maize with plowing.

*Peters.* Good with and without plowing.

Queſtion 6th. In conſequence do you find that it renders the earth ſteril after its uſeful effects are gone?

Anſ. by Mr. *Weſt.* Something of ſterility it creates in five or ſix years by mowing.*

*Hannum.* Its uſeful effects have not ceaſed; applying one buſhel a year.

*Price.*

* Not the *manure*, but the many *crops* taken off, weaken the ſoil; and the four or five years of lay, give the ſoil time to ſettle, become hardened and untilled: and moreover, fibrous rooted plants take place and add to the miſchief.

*Price.* Never any bad effects; and the good ceaſes not.

*Hand.* Quite contrary to ſterility.

*Curwen.* Quite the reverſe of ſterility. No kind of manure gives ſterility.

*Sellers.* Have not obſerved any ſterility.

*Duffield.* Not in the leaſt degree.

*Peters.* No greater degree of ſterility after plaſter than after dung.

Queſtion 7th. To what products can it be beſt applied? grain and what kinds? graſſes and what kinds?

Anſ. by Mr. *Weſt.* It is beſt adapted to graſs and every kind of ſummer grain.

*Hannum.* Beneficially to the production of wheat, rye, barley, Indian-corn, buckwheat, peas, potatoes, cabbage, clover, and all other graſſes common amongſt us.

*Price.* I have found it more beneficially applied to Indian corn than any other grain, having never failed, except in two inſtances: one was in a field

field a third part whereof had buck-wheat in the year before. A row of corn was left unplaſtered, which run acroſs the freſh broken up land and the buckwheat ground. In the latter no effect whatever was perceptible that the plaſter had on it. In the freſh broken up land the crop was very good; more than double the quantity where it was plaſtered than in the row that was not The other inſtance was in *a fine mellow rich* piece of land that had been well manured the year before; from which had been taken a good crop of potatoes and pompions. Three rows were left unplaſtered: but no difference could be ſeen between them and the others, where had been ſown two buſhels per acre. The piece was ſown the ſpring following with barley and clover ſeed, and the plaſter that had been put upon the corn without any advantage, had a great effect upon the clover,

clover, which was much better than where the three rows were omitted. The effects of the plaſter here, as well as in many other inſtances where it has been applied to Indian corn *in mellow land* without effect, is, he ſays, myſterious in its operations. It has never had any effect (when firſt applied) on any other grain except buckwheat, when ſowed on freſh broken up land.*

*Hand.* Oats and maize ſeed wetted and duſted with it before ſown, is very good. With lime equal to 3 or 4 times the quantity put on the corn after it is up.

*Curwen.*

* *Mellow* ſoils, moſt readily imbibe and retain *moiſture;* and therefore have leſs need of the attraction of moiſture by the acid and calcarious matter of gypſum. There is humidity in the drieſt common air that comes in contact with the ſoil; and this air is never quieſcent. The cultivation given to maize cleans and mellows the ſoil. Buckwheat is ſown on ground ſcratched over or very imperfectly tilled, and ſo the ground is *not mellow;* and there the gypſum is uſeful in collecting and retaining *moiſture*, which the ſcratched half tilled ground cannot alone.

*Curwen.* Beſt on red clover, and is good on white clover and mixt graſſes. It enlarges the plant of maize more than the product of the corn. Is very trifling on wheat and rye.†

*Sellers.* All graſſes, eſpecially the clovers.

*Duffield.* Graſſes of all kinds and maize, immediate. All other grain the next year.

*Peters.* Leguminous plants, buckwheat, flax, hemp, rape and other plants producing oil. Garden plants, fruit trees, maize, turnips: oats and barley ſeed wetted and covered with plaſter duſt. Beſt on red clover. Winter grain, oats and barley are not benefitted by top dreſſing with plaſter duſt.

Queſtion

† If it enlarges the plant, it ſo far promotes its condition for yielding much corn: but untimely plowing and breaking the roots, and great drought or exceſſive rains afterwards would ſhorten the crop.

Queſtion 8th. When is the beſt time to ſcatter it?

Anſ. by Mr. *Weſt.* The ſpring when vegetation is abroad.

*Hannum:* 1ſt March if free from froſt, to the 1ſt of May.

*Price:* Soon after clover comes up, and repeat it ſoon as vegetation takes place. On Indian corn inſtantly after the firſt harrowing and moulding.

*Hand:* In April, or June on mowing the firſt crop.

*Curwen:* At any ſeaſon: beſt when vegetation approaches rapidly in the ſpring; or ſoon after mowing the firſt crop.

*Sellers:* The various times in which it was ſcattered, proved equally good.

*Duffield:* Clover being ſown with oats or barley, ſtrew it as theſe grains are taken off; which gives a good growth to the clover before winter ſets in. On a ſward, ſtrew it at any time; and on Indian corn as ſoon

as

as it is up; giving three or four buſhels an acre, over the whole ground.

*Peters:* If ſtrewed in the fall, and a dry froſty winter ſucceeds, much of the plaſter is blown away. He found it anſwer well ſown from beginning of February to the middle of April, in miſty weather.

Queſtion 9th. What is the greateſt product of graſs per acre, you have known by means of plaſter?

Anſ. by Mr. *Weſt:* Equal to any ever ſeen. Would feed as many cattle as acres.

*Hannum:* Three tons from land really poor.

*Price:* Land manured and afterwards plaſtered two crops (cuttings) gave of clover $4\frac{1}{2}$ tons an acre: and poor unmanured land not likely to give half a ton, frequently gave $1\frac{1}{2}$ or 2 tons.

*Hand:*

*Hand:* Three and ſix-tenths tons, and $2\frac{1}{2}$ tons frequently: never leſs than $1\frac{1}{2}$ tons.

*Curwen:* The firſt crop 2 tons; the ſecond crop, nearly one ton; the third reſerved for ſeed. Without plaſter this ground would not yield $\frac{1}{3}$ of the whole quantity.

*Sellers:* Before the uſe of plaſter, little of paſture was given ſcarcely enough to fatten cattle for the family uſe. But for ſeveral years back (with the plaſter applied) 40 to 50 are fattened annually; beſides mowing from the fields, hay enough for a team, family horſes, and 20 cattle.

*Duffield:* Three tons of hay.

*Peters:* Five tons an acre, at two cuttings.

Queſtion 10th. Have you ever uſed it with other manure, and what? and the effects if any ſuperior to the plaſter alone?

Anſ.

Anſ. by Mr. *Weſt:* Never uſed of it with other manure.

*Hannum:* Yes: the land will in leſs time be much more productive. I have not found my land in good heart, in leſs than three years with plaſter only.*

*Price:* I have put it on after *lime and dung* frequently, and have always found the greateſt difference in the effect, where it has been put on entirely *alone*, both on clover and Indian corn. *Where the manure has been put the crop has been the greateſt*, but their operations are entirely independent of each other.*

*Hand:*

* A manuring with *dung* and a manuring with *plaſter*, are as two to one; *two manurings*. Whether the plaſter alone will give good heart to the land in one or in three years will depend on the quantity and the quality of the plaſter; and probably, other circumſtances.

* Do dung and plaſter improve each other's powers? How does this appear? They indeed *aſſiſt the ſoil*, as two to one; and plaſter + dung + lime = 3 manurings.

*Hand:* No more graſs is produced from his lands previouſly manured for other crops, than from thoſe which were not ſo manured, although an equal proportion of plaſter and graſs ſeed were ſown on each: except in one inſtance, where aſhes were ſown on the plaſter a few days after it.

*Curwen:* He never mixed it with manure previous to putting it on the ground, but generally uſed it on ground limed or dunged or both not long before, and found its effects in a great degree proportionate to the manure in the ground; though on ground exhauſted and never manured, the effect was conſiderable.*

*Peters:* lands *limed* freſh and ſome exhauſted are all plaſtered, and there is no difference unfavourable to the limed.

Queſtion

* When it don't follow *dung* or *lime* or other manure, it acts alone—an unit, without addition or aid. When gypſum follows them, then the manurings are tripled.

Queſtion 11th. Is there any difference between the European and the American plaſter?

Anſ. by Mr. *Hannum:* No difference.

*Price:* None in the effects upon graſs or grain: but the European is eaſieſt manufactured, and the American is found to make the ſtrongeſt cement.

*Sellers:* The American is beſt.

*Duffield:* Can diſcover no difference.

*Peters:* The European generally beſt: but has uſed of the Nova Scotia plaſter to equal advantage.

Queſtion 12th. Its duration?

Anſ. by Mr. *Weſt:* The product for five years, mowed twice a year, and the third plaſtered, is more than can be produced from dung.

*Hand:* In one inſtance he mowed the ſame ground four years ſucceſſively after four buſhels of plaſter per acre had been applied; but found that the blue graſs generally begins to appear the

the third year: therefore he wiſhes to mow or paſture two years only, and then plough again.

*Curwen:* With him it has not been uniform. Whether it depends on the quantity applied, the nature of the ſoil, the difference in ſeaſons, or the goodneſs of the plaſter, he cannot ſay: but it ſometimes fails the ſecond year; ſometimes laſts four or five, and where put on the hills of Indian corn and afterwards mixt with the ſoil by plowing, the effects have been viſible for ſix years, and continue the ſame length of time on an exhauſted ſoil never manured.

*Duffield:* Its effects are perceivable for four or five years.

*Peters:* Has had benefit from one dreſſing of three or four buſhels to the acre, for five or ſix years, gradually decreaſing in its powers. Has heard of ſome who ſowed it frequently, and in ſmall quantities, and

and obtained good crops of graſs for twelve years and upwards.

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For ſome years of gypſum being firſt uſed as a manure in America, it was ground down to meaſure only about 20 buſhels a ton. It now is made to meaſure twenty-four or twenty-five buſhels; which Mr. Peters's experience condemns. He ſays 20 buſhels a ton is to be preferred by the farmer; for that when too fine, it flies away in ſtrewing, and is not ſo durable as the coarſer. The miller who ſells plaſter gains by its being made very fine.

We have, ſays Mr. Peters, a ſimple mode of trying the quality of plaſter. A quantity of the powder, when heated in a dry pot over a fire, emits a ſulphureous ſmell. If the ebullition is conſiderable, it is good: if it be ſmall, it is indifferent: if it remains an inert maſs, like ſand, it is worthleſs.

*A Proposal for a State Society, for promoting Agriculture: and that the Education of Youth should direct them to a Knowledge of the Art, at the time they are acquiring other useful Knowledge, suitable to agricultural Citizens.*

At a Special Meeting of the Philadelphia Society for promoting Agriculture, on the 21 of January, 1794.

*AGREED*, That Mr. Bordley, Mr. Clymer, Mr. Peters and Mr. Pickering, be a Committee to prepare Outlines of a Plan for establishing a State Society for the *Promotion of Agriculture*; connecting with it the *Education of Youth* in the Knowledge of that most important Art, while they are acquiring other useful *Knowledge suitable for the agricultural Citizens of the State*:

And a Petition to the Legislature, with a view to obtain an Act of Incorporation.

At

At a Special Meeting of the Society, Jan. 28, 1794.

The Committee appointed at the laſt Meeting to prepare Outlines of a Plan for eſtabliſhing a State Society for the Promotion of Agriculture, and a Petition to the Legiſlature for an Act of Incorporation, made report. The Report was adopted. The ſame Committee are now requeſted to ſign the Petition, preſent it to the Legiſlature, and attend the Committee thereof which may be appointed to confer with them on the ſubject.

To the Senate and Houſe of Repreſentatives of the Commonwealth of Pennſylvania.

The Philadelphia Society for Promoting Agriculture, beg leave to repreſent:

THAT finding the important object of their aſſociation not to be ſufficiently at-

tained on the limited plan, and by the means hitherto purſued, they are deſirous of promoting an eſtabliſhment on a broad and permanent baſis, which may afford more certain proſpects of advancing the intereſts of agriculture. They alſo conceive that the acquiring a knowledge of it may be combined with the education which is practicable and moſt uſeful for the great body of citizens.

To ſhew what in their opinion may, *in proceſs of time*, be accompliſhed, they take the liberty of preſenting to the view of the legiſlature, the annexed Outlines of a Plan for eſtabliſhing a *State Society of Agriculture in Pennſylvania*, which ſhall embrace the aforementioned objects.

They pray that a committee of the legiſlature may be appointed to confer with a committee of the Society on the ſubject; and, as the neceſſary means of conducting the execution of the plan, that an act of incorporation may be granted to the perſons

ſons whoſe names ſhall be preſented for that purpoſe.

The above, with the Outlines, was preſented to the legiſlature, and a conference was held as propoſed: but the proceedings were laid on the table, and nothing more was done.

## OUTLINES OF A PLAN

*For Eſtabliſhing a State Society of Agriculture in Pennſylvania.**

1. The legiſlature to be applied to for an act of incorporation of the ſociety, which is to conſiſt of citizens of the ſtate, as generally diſperſed throughout the ſame as poſſible. In the firſt inſtance, the ſociety to be compoſed of ſuch perſons as may be named, and theſe to be veſted with authority to make rules for admiſſion of other members, and by-laws for the government of the ſociety, as uſual in ſimilar caſes. Honorary

* Brought into the committee by Mr. *Peters*.

Honorary members to be admitted according to rules to be eſtabliſhed, and theſe may be of any ſtate or country.

2. The organization of the ſociety ſhall be ſo formed, that the buſineſs thereof may be done by a few, who will be reſponſible to the body of the ſociety, in ſuch manner as their by-laws ſhall direct.

3. The governor of the ſtate, the ſpeakers of the houſes of the legiſlature, and the chief juſtice for the time being, to be the viſitors of the corporation. The tranſactions of the active members, i. e. thoſe entruſted with the monies and affairs of the ſociety, by whatever name or deſcription they may be deſignated, and all by-laws and regulations, to be ſubmitted to the viſitors; to the end that the ſame may be ſo conducted and eſtabliſhed as not to prejudice the intereſts of the corporation, or interfere with or oppoſe the conſtitution and laws of the ſtate. The viſitors will alſo judge of the objects of the ſociety, and perceive

perceive whether or not they are calculated to promote the ends of its inſtitution. Reports may by them be made annually to the legiſlature. Theſe will be uſeful, as they will exhibit, in a comprehenſive view, the ſtate of agriculture throughout the commonwealth, and give an opportunity to the legiſlature of being informed on a ſubject ſo important to the proſperity of the country, both as it relates to political œconomy and the individual happineſs of the people. The legiſlature will perceive, from their reports, when and in what manner they may lend their aſſiſtance to forward this primary object: Whether by endowing profeſſorſhips, to be annexed to the univerſity of Pennſylvania and the college of Carliſle, and other ſeminaries of learning, for the purpoſe of teaching the chemical, philoſophical and elementary parts of the theory of agriculture: Or by adding to the funds of the ſociety, increaſe their ability to propagate a knowledge of the ſubject, and ſtimulate, by premiums and other incentives, the exertions of the agricultural

agricultural citizens: Or whether by a combination of theſe means the welfare of the ſtate may be more effectually promoted.

4. Though it will be moſt convenient to make the repoſitory of the information of the ſociety, and the office or place of tranſacting its buſineſs, at Philadelphia; yet it is intended that the ſociety ſhall be rendered active in every part of the ſtate. To effect this, there ſhould be county ſocieties eſtabliſhed, organized as each ſhall think proper. In union with, or as parts thereof, there may be agricultural meetings or eſtabliſhments, at the will of thoſe who compoſe them, in one or more townſhips of a county. Theſe may correſpond with the county ſocieties, and the latter may annually inform the ſociety of the ſtate (of which the leſs ſocieties may be conſidered as branches) of all the material tranſactions of their reſpective ſocieties. Societies already formed may remain as they are. They may, at their option, correſpond directly with the ſtate ſociety, or through the

the ſociety of the county in which they meet, as ſhall be found moſt convenient and agreeable to them. This will bind up together all the information and buſineſs relating to the ſubject. It will give an opportunity to the ſociety of the ſtate, to ſee where their aſſiſtance is moſt neceſſary, and afford a facility of diffuſing agricultural knowledge. The premiums, books and other articles, at the diſpoſal of the ſociety, may paſs through the hands of the county or other ſocieties, for many purpoſes; and they can judge on the ſpot, of the pretenſions of the claimants. The county ſchoolmaſters may be the ſecretaries of the county ſocieties; and the ſchool houſes the places of meeting and the repoſitories of their tranſactions, models, &c. The legiſlature may enjoin on theſe ſchoolmaſters, the combination of the ſubject of agriculture with the other parts of education. This may be eaſily effected, by introducing, as ſchoolbooks, thoſe on this ſubject; and thereby making it familiar to their pupils. Theſe will be gaining a knowledge of

of the buſineſs they are deſtined to follow, while they are taught the elementary parts of their education. Books thus profitable to them in the common affairs of life, may be ſubſtituted for ſome of thoſe now uſed; and they can eaſily be obtained. Selections from the beſt writers on huſbandry may be made by the ſociety. The eſſays of our own experimentaliſts or theoriſts, and the proceedings of the ſociety, will alſo afford information; and as many of theſe will, no doubt, be good models of compoſition, they may form a part of the ſelection for the uſe of the county ſchools. And thus the youth in our country will effectually, and at a cheap rate, be grounded in the knowledge of this important ſubject. They will be eaſily inſpired with a thirſt for inquiry and experiment, and either never acquire, or ſoon baniſh, attachments to bad ſyſtems, originating in the ignorance and bigotry of their forefathers, which in all countries have been the bane of good huſbandry. It will alſo be the buſineſs of the ſociety to recommend the collection of

uſeful

uſeful books on agriculture and rural affairs in every county. The citizens of the country ſhould be drawn into a ſpirit of inquiry by the eſtabliſhment of ſmall, but well choſen libraries, on various ſubjects. This would not only promote the intereſts of agriculture, but it would diffuſe knowledge among the people and aſſiſt good government, which is never in danger while a free people are well informed.

5. The general meetings of this ſociety, conſiſting of ſuch members as may chooſe to attend, and particularly thoſe charged with communications or information from the county and other ſocieties, ſhould be held at Philadelphia, at a time, in the winter ſeſſions of the legiſlature, when citizens who may be members thereof, or have other buſineſs, can with moſt convenience attend. At theſe meetings, the general buſineſs of the ſociety can be arranged, its funds and tranſactions examined, and its laws and rules reported, diſcuſſed and rendered

dered generally ſerviceable and agreeable to the whole.

6. It will be neceſſary that a contribution be made by each member, annually, for a fund. But this ſhould be ſmall, that it may not be too heavy a tax on members. The funds will, no doubt, be increaſed by donations from individuals; and if the ſtate ſhould find the inſtitution as uſeful as it is contemplated to be, the patriotiſm of the members of the government will be exerciſed, by affording aſſiſtance out of the monies of the ſtate. They will perceive that it is vain to give facilities to tranſportation, unleſs the products of the country are increaſed by good huſbandry: and though theſe facilities are important to the objects of this ſociety, yet an increaſed knowledge of agriculture is the foundation of their extenſive utility. The ſubjects of both are intimately connected, and mutually depend on each other.

7. When

7. When the funds of the ſociety increaſe ſufficiently to embrace the object, it will perfect all its efforts by eſtabliſhing *pattern farms*, in different and convenient parts of the ſtate. Let the beginning of this plan be with one eſtabliſhment, under the direction of the ſociety, and committed to the care of a complete farmer and gardener. In this, all foreign and domeſtic trees, ſhrubs, plants, ſeeds or grains may be cultivated, and if approved as uſeful, diſſeminated, with directions for their culture, through the ſtate. The moſt approved implements may be uſed on this farm, and either improved by additions, or ſimplified to advantage. Inventions may be brought to trial, and the beſt ſelected. Models thereof may be made and tranſmitted to the county and other ſocieties. Thoſe who are ſent to, or occaſionally viſit the farm, will gain more knowledge, in all its operations, from a ſhort inſpection, than can be acquired, in a long time, by reading on the uſe and conſtruction of inſtruments, or the modes of cultivation. The cheapeſt, beſt

beſt and moſt commodious ſtyle of rural architecture—the moſt proper and permanent live-fences—improvements in the breed of horſes, cattle and ſheep—remedies for occaſional and unforeſeen viſitations of vermin—the times and ſeaſons for ſowing particular crops—the adapting foreign products to our climate—and preventives againſt all the evils attendant on our local ſituation, or ariſing from accidental cauſes—may here be practically introduced. The thoughts and ſuggeſtions of ingenious men may here be put in practice; and being brought to the teſt of experiment, their utility may be proved, or their fallacy detected. This farm need not be large. On it the beſt ſyſtems now known may be carried through, and farther experiments made; promiſing youths may be ſent from different parts of the ſtate, to learn practically the arts of huſbandry. Manures and the beſt mode of collecting them, may be tried; native manures ſhould be ſought after, and premiums given for their diſcovery. Their efficacy may be proved

proved by ſmall experiments on this farm, which ſhould, in epitome, embrace the whole circle of practical huſbandry. Similar farms may be added, as the funds increaſe; and thus practical agricultural ſchools be inſtituted throughout the ſtate.

8. When the pecuniary affairs of the ſociety become adequate, it will highly contribute to the intereſt of agriculture, if, at the expenſe of the ſociety, ſome ingenious perſon or perſons were ſent to Europe, for the purpoſes of agricultural inquiries. It would be well too, if a few young perſons, of promiſing abilities, were ſent thither, to be inſtructed in the arts of huſbandry, the breeding of cattle, &c. and to gain a practical knowledge on all ſubjects connected with this intereſting, delightful and important buſineſs, on which the exiſtence, wealth and permanent proſperity of our country ſo materially depend.

9. Although it would ſeem that a great portion of this plan has reference to the older

older ſettlements of the ſtate, yet in fact, many of its moſt uſeful arrangements will apply to new ſettlements, in an eminent degree. Theſe ſettlements are, for the moſt part, firſt eſtabliſhed by people little acquainted with a good ſtyle of huſbandry. The earth, in its prime, throws up abundant vegetation, and for a ſhort period rewards the moſt careleſs huſbandman. Fertility is antecedent to his efforts; and he has it not to recreate by artificial means. But he is ignorant of the moſt beneficial modes whereby he can take advantage of this youthful vigour, with which his ſoil is bleſſed. He waſtes its ſtrength, and ſuffers its riches to flee away. A bad ſtyle of cropping increaſes the tendency of freſh lands to throw up weeds and other noxious herbage; and that luxuriance, which with care and ſyſtem might be perpetuated, is indulged in its own deſtruction. It is diſcovered, when it is too late, that what was the foundation of the ſupport and wealth of the improvident poſſeſſor, has been, by his ignorance and neglect, like the patri-

mony

mony of a ſpendthrift, permitted, and even ſtimulated, rapidly to paſs from him in wild extravagance.

The products of nature, in our new countries, ſeldom have been turned to account. The timber is deemed an incumbrance, and at preſent is perhaps too much ſo. The labour and expenſe of preparing for tillage are enormous; and, when the ſole object is that of cultivation, very diſcouraging. European books give us no leſſons in theſe operations. But when the experience of our people is aided and brought to a point, by an union of facts and the ingenuity of intelligent men, now too much diſperſed to be drawn into ſyſtem, it is to be expected, with the ſureſt proſpects of ſucceſs, that our difficulties on this head will be abated, if not overcome. The manufacture of potaſh, and the products of the ſugar-maple, may be objects of the attention of the ſociety. More profitable modes of applying labour will hereby be promoted, and returns for expenſe in

the preparation for culture, be obtained. Facilities for clearing lands may be diſcovered. Minerals, earths and foſſils now unknown or neglected, may be brought into uſe, or become objects of commerce. In fine, no adequate calculation can be formed of the effects which may be produced by a conſolidation of the efforts, and even ſpeculations, of our citizens, whoſe intereſts will ſtimulate them to exertion. Channels of communication will be eſtabliſhed, and the whole will receive the benefits ariſing from a collection of the thoughts and labours of individuals, whoſe minds will be turned to a ſubject ſo engaging and profitable, as well to themſelves as to their country.

The application was rejected; by *huſbandmen* who were principally to be benefitted.

NOTES

## *NOTES AND INTIMATIONS.*

"*The inhabitants of the inland country have "more integrity, ſimplicity, and generoſity; "and in all reſpects have more amiable man- "ners, than thoſe of the ſea coast. The latter "have contracted a trafficking keen ſpirit, na- "turally inimical to the virtues founded on "moderation and diſintereſtedneſs.*" Vol. Syr.

## *V E A L S.*

In ſelling veals to butchers their haggling was extremely diſagreeable; and to avoid it I ſometimes either at once broke off, or gave up to their offers. At length, after weighing veals killed for my family, I fixed on a price by live weight; at which to ſell. The butchers at firſt refuſed to be fixed at any rate; they afterwards came to, and agreed at 3d. live weight.

A veal alive weighed 146lb.
—The four quarters 70

which is within 3lb of half the live weight:

At 3*d.* live weight, this veal would coſt them 36*ſ.* 6*d.*: but, for ſuch, they uſed to give me 32*ſ.* to 33*ſ.* on the foot. The firſt ſold by live weight were 4 veals; medium live weight 133½, which averaged 33*ſ.* 2*d.* a veal. They uſually ſold at 7*d.* ſcarcely any part under 6*d.* ſometimes 7½ and 8*d.* Their gain was above 40 per cent. Lord Kaims ſays, butchers gain but 5 per cent in Scotland. They diſliked the method by live weight; becauſe of the certainty reducing uſual profits, gained from their ſuperior ſkill in eſtimating the weight and value of veals.

## *H A M S.*

| | | lb. | lb. |
|---|---|---|---|
| 1788. Dec. 2 | —20 of my family hams, trimmed, weighed green, | 321 | or each 16 6/10 |
| 1789. June 30 | —They weighed, when full ſmoked, | 256 | 12 8/10 |
| | Evaporation | 65 | 3 8/10 |

The loſs of weight 20¼ p. cent or about ⅕th.

Dec.

| | |
|---|---|
| Dec. 22. A tenant's hams; 2 weighed, green and trimmed | 31 |
| Aug. 11. The ſame when ſmoked | 26 |
| Evaporation | 5 or 16 p. cent. |

The tenant's were not ſo much ſmoked or dried, as he cured them for ſale and to weigh.

## *FAMILY PICKLED BEEF.*

"Two pounds *brown ſugar* are mixed with a quarter pound of *ſalt petre* pounded *very fine*. One half of it is rubbed together with a little fine *ſalt* over the beef. Four gallons of brine, bearing an egg, are boiled and ſkimmed; and when *cold*, the remainder of the *ſugar and nitre* is added. The beef is then ſunk in the pickle, and kept down with a weight."

## *FAMILY DRIED BEEF.*

"Rub the Beef with a mixture of 1 lb *ſugar*, $\frac{1}{8}$ lb of *ſalt-petre* and a little *ſalt*. The nitre, eſpecially

eſpecially, in a very fine powder. The beef is to remain 3 days in a tub; and is then again rubbed with a little more of the ſame ingredients. The beef, returned to the tub, is to lay two or three days more; and is then hung up to dry. It ſeems as if this is meant to be dried without ſmoke: but others ſmoke it very lightly, and then hang it, expoſed to wind and air, in a dry room.—Cellars and all *damp* places are improper for keeping meat, either ſalt or freſh."

## *WATER BISCUIT.*

The great eſſential neceſſary, is to avoid ever once drowning the flour. Give water, a little and little at a time. The maſs of dough is to be worked up very dry, under the hand: ſo that when all is done that can be by the hands, towards gathering the materials together in a firm maſs, it ſtill is in parts dry and in cracks with flour here and there untaken up. The rude maſs is then committed to a brake (or heavy beater) with which it is worked a great deal, until

it

it becomes ſmooth and ſolid, without any further addition of water. If the flour is once drowned, the damage cannot well be repaired by any addition of flour; and the oven is heated to bake *quick* as may be without burning. Theſe points obſerved, prevent flintineſs.

## *VINEGAR.*

"Ten gallons of cyder *new* from the preſs, are ſuffered to ferment, *fully:* which may be in about two weeks. Add then 8 gallons of like cyder, that is *new;* for producing a *ſecond fermentation.* In two weeks more, add another like *new* quantity, for producing a *third fermentation.* This *third* fermentation is material. Now ſtop the bunghole with an empty bottle, or flaſk, the neck down. Expoſe it to the ſun for ſome time.—When the vinegar is come, *draw off one half* into a vinegar caſk, and ſet it in a cool place, above ground, for uſe when clear. With the *other half* in the firſt caſk, proceed to make more vinegar in the

the ſame method. Thus always one caſk is to make in; and another to uſe from.

In preparing malt wort for making vinegar, it is neither boiled nor hopped; but only *fermented* and ſet by the fire or in the ſun. A few days produce it, ſays farmer Ellis. Suppoſe it managed as the apple juice, above, for producing the *three fermentations?*"

The plant *Tarragon*, called by the French, *Eſtragon*, gives to vinegar the moſt excellent flavor, without diſcolouring it. It is propagated by the plants, and it would be well to introduce it into our gardens from Europe.

Tarragon juſt as it is about to bloom, is ſtript of its leaves, and a gallon of beſt vinegar is put to every pound of Tarragon leaves, in a ſtone jug or demi-john, and left to ferment 14 days. It is then run through a flannel bag. To every four gallons of the vinegar put half an ounce of iſinglaſs

iſinglaſs diſſolved in cyder: mix all well and put it into bottles to ſtand a month to fine: then rack it off, and bottle it for uſe.

## *LOAF-BREAD.*

A ſimple and much approved method of making good white bread, is given by Mr. Doſſie, thus:

| | lb. | | oz. | |
|---|---|---|---|---|
| "Fine flour | 6 | : | — | |
| Water 2½ pints, or | 2 | : | 8 | |
| Yeaſt, liquid, | 0 | : | 4 or 8 | ſpoonsful |
| Salt | 0 | : | 2 | |
| | 8 | : | 14 | |

The water is *warm*, *not* hot.* A part of it is put to the yeaſt, and well mixed by beating them together with a whiſk. The ſalt is put to the other part of the warm water

* A neighbour, nice in bread, obſerving the fine bread in my family made of dry or cake yeaſt, was preſented with a bottle of the yeaſt; but afterwards complained the dough could not be made to riſe. She *ſcalded* the yeaſt.

water, and ſtirred till diſſolved. Then put both the quantities of the fluid, *gradually* to the flour; and knead the maſs well, till the whole is perfectly mixed. The dough thus made, ſtands four or five hours: that is till the *critical* moment of its being *fully riſen*, yet *before it falls any* or more than juſt to be perceived. It is now formed into loaves, and *immediately* ſet in the oven. Baking it properly is a difficulty, to thoſe not well practiſed: for this, the oven is to be made *hot* as may be without burning the cruſt. If a green vegetable turns black when put in, the oven will burn the bread; and it is then to ſtand open till the heat has ſomewhat abated. The next care is to keep the mouth of the oven *well cloſed* till the bread has riſen to its *full height*. The time for this may be two or three hours. After which, and *not before*, the oven may be opened for viewing the bread, at pleaſure, to ſee that it is baked without being burnt or too cruſty. If the mouth of the oven be not *very cloſely* ſtopt *at the firſt* putting in the bread, and *ſo kept* till the

the bread is *fully* riſen, it will flatten and not be ſo light, as otherwiſe it would be.—When the bread is baked enough, the above ingredients will have loſt about 1 *lb*, 2 *oz.* ſays Mr. Doſſie; which leaves 7 *lb*, 12 *oz.* of well baked bread." A French author (Deliſle's Arithmetic) ſays bread ought to be $\frac{1}{3}$ more than the flour alone; and he appears accurate. But do the French bake ſo brown and *dry* as the Engliſh, who ſometimes burn and chip the cruſt.

## *SHEEP.*

*Sheep* do not ſuffer by being *tied up;* but fatten extremely well on peas, oats, oil-cake (flaxſeed jelly and maize meal). The ewes have pea-ſtraw and even oats, *when they lamb;* ſays Mr. Tooſey. For *ſoiling* and *ſtall-feeding ſheep*, ſee Annals 11 vol. 30; in Germany. Pa. 37, in Suffolk; and 12 vol. 234; 14 vol. 133; in Canady 17 vol. 287.

## *MANURE.*

## *MANURE.*

*Fixed air*, ſays Mr. Amos, is abundant in *calcarious* and *alkaline* earths and ſalts; from $\frac{1}{2}$ to $\frac{3}{4}$ of their whole ſubſtance: from whence it is that they are manures; and they *attract* this air from the atmoſphere. That it is ſo is evident from the abundance of it that vegetables yield in putrefaction. This fixed air conſiſts of *earth*, *water*, *acids*, and *phlogiſton*. A *tun* of *cauſtic lime* attracts ten to 15 hundred pounds of it.—Limeſtone, 100 parts, crude, contains about 40 *of fixed air*, 55 *of calcarious* matter, and $\frac{1}{100}$ of *water*. Calcining it, muſt diſcharge the water, and moſt of the fixed air which is ſo important to the maſs, as a manure.—But are not theſe again reſtored *to the lime*, in ſlacking or after it is ſlacked?—He ſays further, that *quicklime* unites the *watery* and *oily* parts of ſoil, juſt as it forms ſoap. "It is, he continues, alſo in favour of *lime*, that, expoſed to the air it ſooner or later acquires its original weight: ſo that the ſoil on which *quick-*

*lime*

*lime* is ſpread, acquires a great increaſe of matter; the *virtue of the lime conſiſting chiefly in its power* of *attraction.*" Am. Drill. Huſb. 26. 44. 45.—It is ſaid in America, that 6 or 8 buſhels raw powder of lime *ſtone*, manures an acre of land, well. I am but now informed of this; when I can no longer make experiments of the kind.

## *CALVES.*

Calves running with the cows till 6 or 9 months old, get a good growth. But the beſt *dairy method* is this:—the calves ſuck a week or two, according to their ſtrength: *new milk* in the pail is then given them, a *few meals:* then *new* and *ſkimmed* milk, mixt, a *few meals:* then *ſkim milk* alone; or *porridge* made with milk, *water*, *meal* of oats, &c. until cheeſe-making begins: after which *whey porridge*; or *ſweet whey* in the field; being careful to houſe them at night, till warm weather is ſettled. Marſh. Midland Counties, 338.. Soft ſweet hay and

and cut graſs may be laid in their way; with a maſs of *ſalt* clay, as a lick.

## *BUGS, called CHINCHES.*

" The French ſay, take rectified *ſpirit of wine* 1 lb, *ſpirit of turpentine* 1 lb, *camphor* 1 oz. Diſſolve, *entirely*, the camphor in the mixt liquor; and rub over bedſteads, &c. 16 An. 425. But, a *clear ſtrong lime water*, it is ſaid, anſwers perfectly well; is neater, and is even harmleſs to died ſilks.

## *BRINE or PICKLE.*

The rule of brine bearing an egg, may do for things to be ſoon uſed. But ought not a true *full* pickle, for keeping *meat*, *fiſh* and *butter*, to be *boiled down* till the ſalt begins to cryſtallize? a ſlight ſcum on the top ſhews this, whilſt the pickle is yet over the fire."

## *ICE and ICE-CREAMS.*

" Two pewter baſons, one *large* the other *ſmall:* the ſmall one to have a cloſe cover; in

in this baſon the cream is put and mixt with ſtrawberries, &c. to give flavour and colour: ſweeten it. Cover it cloſe and ſet the ſmall baſon in the large one. Fill this with *ice* and a handful of *ſalt*, to ſtand ¾ of an hour: then *uncover* and *ſtir* the cream well together: cover it cloſe again, to ſtand ½ an hour longer; and then it may be turned into a plate. *Tin* or copper veſſels may do."

Ice-houſes are to be left open ſome time, till *dry*, before filling them with ice. When the houſe is to be charged with ice, firſt lay *ſmall faggots* on the grate; and on theſe *reeds*, rather than ſtraw as is common. Perhaps clean corn-ſtalks without the roots, where reeds are not to be got. The *thinner the ice*, the eaſier it is *broken to powder*; and the ſmaller it is broken, the better it will unite into one maſs.—*Ram* the ice cloſe as poſſible in its place.

FISH

## *FISH, CURED IN THE SUN.*

"Soon as poſſible, after caught, *ſplit* down the back, ſpread them *open* and flat—gut and *waſh* out the blood—*drain* them hanging by the tails, in the cool of the evening or in a cool place—ſtrew ſalt on the bottom of the tub—ſprinkle them well with *clean, fine ſalt*—place them belly to belly in the tub, to lay there 12 hours—then *waſh off the ſalt*, in the *pickle*—again hang by the tails, to *drain* ½ an hour—lay them to *dry*, on *ſtones* or ſweet wood, inclining to the *ſun*—never leave them out when the ſun is off—nor lay them out in the morning till the *dew is off and the ſun ſhines*—a week of fine weather, or leſs, cures them. When cured hang them up, belly to belly, in a very dry place."

## *HOUSE-CISTERNS.*

They are becoming more common in Europe. A roof of a houſe, gives a ſufficient ſupply of water. *Rain-water*, when confined

confined under ground, becomes very *pure*, *palatable*, and *cool* even in ſummer. The ciſtern is in a yard or inſide or outſide of the kitchen, in ſome corner near the door. The *deeper the better* the water will be kept. Where the ground is not ſo bad as to require a round form to a ciſtern, a cube is a good figure: a double cube muſt be better, as it gains *depth* and *coolneſs*. A ciſtern of 6 cubic feet, holds 16 hhds. of 100 gal. each; or 26 wine hhds. But the double cube of 5 feet ſeems better, and would hold above 18 rum hhds. of 100 gal. or near 30 wine hhds.; and would be 10 feet deep, and cool and ſweet in proportion. The pit ſhould be dug exactly by *ſquare and plum*, for carrying up the wall to advantage. On the face of the pit, lay the clay plaſterwiſe with a trowel, coat over coat (as it dries and cracks) two or three inches thick in all. Againſt this firm even face of plaſter, raiſe the brick or ſtone work. Bed the bottom 3 or 4 inches thick with ſtrong clay, beat into a ſmooth, even wax-like ſubſtance. The clay is moderate-

ly wetted and beaten with ſwitches, withs, ſmall hoop-poles: not with any thing heavy, or having a broad ſurface. On this clay floor, lay a double bed of brick; and on the margin of this carry up the ſide walls, half brick thick, laying them in terras. Cover the ciſtern over, cloſe as may be. A ſmall pump, of wood or lead, or better of *iron:* the pump to be two feet from the bottom: or a roller and bucket raiſes the water. Upon theſe principles, but not exactly like this mode in all particulars, for clay ſupplied the place of terras, a ciſtern was built for me ſix years ſince, in Philadelphia, which has continued perfect from the beginning. In many places in Europe, rain water ſaved in ciſterns is the only water drunk. And Stolberg's Travels ſay rain water in ciſterns, is eſteemed according to its age, as it is more pure. He drank of ſome near Naples, *three years old;* and it was *excellent*. How ſuperior would ciſtern water be to the people on the flat coaſts of America; and wherever

wherever elſe the water is not the pureſt from ſprings and wells.

## *WATERING-PONDS.*

The 1ſt Bath Letters, and 6th and 8th Annals, ſpeak of the practice in making theſe ponds in dry fields and yards. Dry lime is ſifted 2 or 3 inches thick on the bottom of the place ſcooped out for the pond, for obſtructing worms and beetles. On this lay *clay*, *moiſt* (ſcarcely wet) well ſwitched and *beaten*, 6 or 7 inches thick. On this lay *gravel*, 6 inches thick. A pond 20 yards diameter, is dug out one foot deep, and then deepened, ſloping like a bowl, to the centre; where it is $4\frac{1}{2}$ or 5 feet deep.

## *HERRINGS, SALTED—AND CURED.*

Lord Dundonald, in his book on ſalt, gives the *Dutch* method of *ſalting* herrings —and then of *curing* them; a diſtinct operation from ſalting. SALTING: immediately as taken, gut the herrings, by the

finger and thumb tearing away the gills, liver and ſtomach; the long gut, to which a fat membrane adheres, is drawn ſo far out as to be left pendent. Soon as gutted, ſalt the fiſh, and ſtow them *cloſe*, in the barrel; laying each layer in a contrary direction to the one below. The barrel is coopered *cloſe* up, ſoon as full. Be careful to have none but perfectly tight barrels. The herrings remain thus, to *pine* in this firſt ſalt or brine, 14 days with *ſmall ſalt*, or 3 or 4 weeks with *large ſalt*.—CURING: This prevents a tendency, which the bloody liquor or brine has to putrify. A proper *curing* depends on a proceſs whereby the *oil*, contained in the prepared liquor or brine, by being rendered *miſcible with water*, and reduced to a ſaponaceous ſtate, is preſerved from the action of the *air* and turning rancid.—After the herrings have been a ſufficient time in ſalt to *pine* or throw their liquor (part with their juices), empty the barrels of them upon a large dreſſer having a ledge round it, and inclining one way for the liquor to run off into a veſſel.

Boil

Boil the brine in an iron veſſel: ſkim and draw it into a wooden receiver; letting it *cool;* take the *melts* of thirty male herrings for every barrel. Bruiſe or triturate them in a mortar: add of the liquor, as you triturate; and when well diſſolved to the ſtate of a rich emulſion or ſaponaceous liquor, add it to the boiled liquor in the wooden veſſel. Then lay the herrings in the barrels, and a layer of ſalt between the rows, as in the firſt ſalting. Cooper (cloſe) the barrels, and fill them with prepared liquor, at the bung or head.

## *CANDLES.*

" Diſſolve 25lb of *beef tallow* and 15 of *mutton tallow*, in a copper or braſs veſſel, with $\frac{1}{2}$lb of *boiling water* to each pound of tallow. Mix therein $1\frac{1}{2}$ quart of *brandy*, when the tallow is melted, and 5 ounces *ſalt of tartar*, 5 ounces *ſal ammoniac*, 5 ounces *cream of tartar*, and 2 ounces dry, clean *potaſh*. Boil all together $\frac{1}{4}$ hour. Cool it. Next day take out the cake, cut it into ſlices,

ſlices, and expoſe to the *dew* and air, till they become a fine white and hard almoſt as wax. Make the wicks of *beſt* cotton, ſpun very *fine* and very *even*, and *clean*. Steep the wicks in ſpirits of wine; and harden them under a coat of wax. Then pour the tallow on them, in moulds."

## *POKEMELY.*

Green cucumbers, middle ſized, are put into a *jar* or caſk. Upon each layer of them, add a layer of *white* oak leaves, and black currant leaves. Over every layer ſprinkle dill ſeeds, muſtard ſeed, horſe-radiſh and garlic: and to every twenty cucumbers, one bell of pepper. Make a brine of ſalt and water, not quite ſo ſtrong as to bear an egg: to every gallon whereof add a quart of good white wine vinegar; and fill the jar or caſk with the pickle, cold, after it has been boiled and ſkimmed. A gentleman from Ruſſia, gave this account, to ſome friends in Philadelphia. He ſaid the pickled cucumbers, according to the above,

above, are uſed in Ruſſia; and that it is ſaid there, the Empreſs had a caſk of them for every day in the year. Mr. Swinton, the traveller, gives another way of making pokemely; which is this:—A layer of oak leaves is firſt put into the bottom of *a caſk* which is beſt of *oak:* then a layer of cucumbers; and ſo alternately till the caſk is filled. A pickle is made, as is common, with ſalt and water; not too ſtrong: and it is poured over the cucumbers in the caſk. The caſk is kept in a cool cellar. The cucumber is ſoon fit for uſe, and keeps good a year or more. He imagines if ſome vinegar was added, it would be wholeſome, eſpecially to Ruſſians whoſe great uſe of ſalt meſſes renders them very ſcorbutic. The gentleman who gave the firſt above receipt ſaid, the pickle was but to be acidulated ſo that the taſte of vinegar ſhould be very ſlight. He directed alſo that the caſk be of *oak*, and the cucumbers be rather full grown, and put in whole. I have eat of them as made in the firſt above method,

alſo

alſo ſome ſplit into four lengths. It is a much admired pickle, mild and winning. I ſaw a lady nearly make her dinner of them: for they are ſerved up in plates-full; and are in a ſtile different from, and milder than other pickles.

## *RENNET.*

Mr. Marſhal, in his Rural Economy of Norfolk, gives the following as the beſt way of ſaving rennet ſkins.—Throwing away the curd, the ſtomach of the calf is waſhed clean, and ſalted thoroughly, inſide and out, (with fine pounded ſalt, it is preſumed; for he adds) leaving a white coat of ſalt over every part of it. It is then placed in an earthen (better if ſtone) jar, for 3 or 4 days. It is then hung up, 2 or 3 days; and reſalted and placed again in the jar, covered tight down with a paper pierced with a large pin; where it remains till wanted, for uſe. It ought to remain ſo 12 months, to be ſtrong:

but

but may be uſed a few days after the ſecond ſalting.

## *RENNET LIQUOR.*

A handful of the leaves of ſweet briar, another of the dog roſe, and another of the bramble, are boiled together in a gallon of water, with three or four handsful of ſalt, for a quarter of an hour. Strain off the liquor, and when quite cool, put it into an earthen or ſtone veſſel, and add the prepared maw or ſtomach ſkin. Then add a ſound lemon, ſtuck round with $\frac{1}{4}$ ounce of cloves. The longer it is in the liquor the ſtronger is the rennet. When ſtrong enough, take out the ſkin. Hang it up two or three days to drain. Reſalt it: put it again in the jar; and thus continue to treat it, till its virtues are exhauſted, which will not be till uſed ſeveral times. *Marſhal.*

## *CURD.*

The warmer the milk, the ſooner it coagulates: but if too warm, the curd is tough

tough and harſh. The cooler the milk and longer in coagulating, the more tender and delicate the curd.—The length of time between the *ſetting* the milk and the *coming* of the curd, may be regulated by the *warmth of the milk* when ſet; or by the warmth in which it is *kept* whilſt it is coagulating; or by the *ſtrength and quantity* of the rennet. —Perhaps it is not the heat when *ſet*, but the heat when it *comes*, which gives the quality of the curd.—The curd ſhould be *covered* to make it come *together:* it may otherwiſe be hard at the bottom, half an hour before it comes at the top.—Milk immediately from the cow is 95° of heat—From a number of experiments Mr. Marſhal concludes that curd of a good quality, is obtained from *milk heated from* 87 to 103° of Farenheit; provided that the rennet be ſo proportioned that the *time* of coagulation be from $\frac{3}{4}$ to $2\frac{1}{2}$ hours; and provided that the milk be properly *covered*, during the proceſs of coagulation—But from theſe and numbers of other obſervations, it rather ſeems to him, at preſent, that

that from 85 *to* 90 are the proper degrees of heat: that from *one to two hours* is the proper time of *coagulation*, and for keeping the milk *covered*; ſo as to loſe in the proceſs about 5° of its original heat. *Marſhal.*

## *B E E R.*

It is ſaid Sir John Dalrymple propoſes that beer be brewed with *wort-cake* and *hop-cake*, combined with *yeaſt-powder*: which may be with cold water. One pound of the cake is to make a gallon of table beer: and it is thought it would anſwer well at ſea, and ſave ſtowage.—I have, by ſmearing tubs, cured yeaſt in cakes by gentle evaporation in the ſhade: and ſo it ſeems *wort* is to be reduced. My dried cakes of yeaſt were broke ſmall, and kept in bottles, perfectly *dry* and well corked.

## *E G G S.*

Into a tub put a buſhel quicklime, 2lb ſalt, ½lb of cream of tartar, mixt in water to

to bear an egg with its top juſt above water. Keep eggs in this; which may be two years, ſays Repert. 177.

## *L E V E L.*

The *ſpan-level* is always uſed by irrigators of meadows in Pennſylvania. The biſhop of Landiff (Doctor Shipley) it is ſaid was ſo pleaſed with it that he prevailed with Mr. E. a Pennſylvania farmer to direct the making them for him. The Repertory of arts has given an account and drawing of one. It is, ſays the Repertory, thus uſed in levelling ground:—At the level of the water, where you begin, drive a pin into the ground; on which one leg of the level can reſt; then bring the other leg round, till it touches the ground on a level with the top of that pin: there drive in another pin; and having adjuſted the level *perfectly*, make uſe of this laſt pin as a reſt for one foot, turn the other about till you find the level in the ſame way; and ſo proceed on. Thus at once you diſcover the

preciſe

preciſe directions that the water courſe ſhould hold, without digging through heights or filling up hollows. This is to conduct water *perfectly level*.—If *declivity* is to be given $\frac{1}{4}$ $\frac{1}{2}$ inch or more in every 12 feet (the ſpan of the level), inſtead of wooden pins, make uſe of *one pin of ſteel*, having *inches*, *halves*, and *quarters*, marked on the ſides, from the ſquare top downwards; and have *a number of wooden pins*, cut nearly at the top quite ſquare. After fixing the iron pin quite level with the firſt, drive a wooden pin into the ground cloſe by it, making its head go $\frac{1}{4}$ or $\frac{1}{2}$ inch lower than the top of the iron pin. Then pulling out the iron pin, and employing the wooden one as a reſt for one of the legs, put the iron pin in again for the other leg, and driving another wooden pin into the ground, a quarter inch lower, proceed forward in this manner, and the canal will have the ſame uniform degree of ſlope, throughout its whole extent. Thus the fall can be regulated to any aſſignable degree. One of theſe levels I uſed at *Como*, in Cheſter county, with

with great ſatisfaction, for directing water in irrigating the land.

## *WILLOWS.*

There are low, broken, ſwampy lands in America, little ſuitable for meadow, which may be profitably planted with willows. A Mr. Lowe, in England, improved ſuch ground; by laying it out from 3 to 4 yards wide, with a ditch on each ſide, 3 feet at top, 1 foot at bottom, $2\frac{1}{2}$ feet deep; but the ditch is to be deep and wide, according to the condition of the ground, for giving near a yard of earth *above the level of the water;* towards which purpoſe, the earth dug out of the ditches, is thrown on the land. Then dig the ground two ſpades depth, unleſs it be very boggy. The plants are to be kept perfectly clean, eſpecially the firſt year. The ſets or truncheons are cut 20 to 24 inches; avoiding to bruiſe the bark in cutting or planting: they are therefore cut in the hand, not on a block. The ground is opened with a crow bar,

bar, 14 to 20 inches and 4 to 6 inches are left above ground. The cuttings were from poles of three years growth; and placed 3 feet apart, quincunx.—One, two, or three ſhoots were left to grow. At 8 years old he ſold off near 500 dollars worth on an acre. Where the plants are puny and weak, dig in manure to their roots. The poles ſo ſold, at 8 years old, were 33 to 36 feet high, enough for three rails, 2 at bottom and one at top. But their great uſe was in making hurdles, gates and implements of huſbandry. The time for planting is from January to the end of March; and the ſets are to be *cut* from December to the end of February, *whilſt the ſap is down.* Rep.—It is with caution that the *yellow willow* ſhould be planted near ſprings and wells of water. I have heard of theſe being damaged greatly, by the willow roots, and of a ſpring being ſtopt entirely. On a farm which I lately bought in Cheſter county, water was carried under ground, near 300 yards, from a ſpring; which had been choaked, as the tenant thought miſchievouſly,

chievouſly, by twigs of the yellow willow being cut and put into the tube at the ſpring. They drifted and lodged at different parts of the tube, and there threw out maſſes of roots, very ſmall, ſponge-like, and cloſe, ſo that the water was, in a while, totally ſtopt from paſſing through. The whole of the tubes I have cauſed to be taken up and replaced; and a ſtone houſe built, and locked up, over the ſpring. See, of Swamps: next paragraph.

## *SWAMPS.*

I have read of a ſwamp on an eſtate, of which meadow could not be made; and, being a diſagreeable object, large deep ditches were dug, and the earth thrown up into little iſlands; which were planted with willows, and formed beautiful clumps of trees, here and there; ſo that nothing was ſeen but theſe trees, and various peeps of water. The ditches anſwered for fiſh-ponds. See of willows; the preceding article.

Mr.

Mr. Young ſpeaks of fiſh-ponds; and of four ponds, an acre each, one above another, on a ſtream, which turned a mill below the ponds. 19 An. 400.

## *DISTILLATION.*

The *Dutch* method of preparing waſh, for malt ſpirit, ſaves much trouble and procures a large quantity of ſpirit. It is the moſt profitable method, and reduces the two operations of *brewing and fermenting* into *one.* It is this:—In proportion to 10lb malt in a *fine* meal, and 3lb of common wheat meal, they add 2 gallons *cold* water, ſtirring all well together: then add 5 gallons of water *boiling hot;* and again ſtir all together. When this is cold they add 2 ounces of *ſolid* yeaſt; and ferment it in a warm place, looſely covered.—In England, by drawing and maſhing for ſpirit, as they do for beer; pumping into coolers, and running it into fermenting backs, and fermenting it, they have twice the labour, and loſe much ſpirit, by leav-

ing the groſs bottoms out of the ſtill, for fear of burning. Sibley's Hiſt. Miſcel. pa. 352.

## *POWER — DRAUGHT.*

The 16 An. 562, ſays, *cars with one horſe* are preferred; and that they carry 160 large bricks, of 14lb, equal to 2240lb. Theſe cars are about 5 feet ſquare, and 1 foot deep. The *wheels two feet* diameter, run *under* the car, as in Ireland.*

The 18 An. 179, ſays, one-horſe carts prove much preferable for all works of huſbandry: and the form of one, *with an ox* in thills and gears, and bridled, is given. This

* I directed a cart to be made on the principles of Sharp's waggons on rollers. The wheels of this cart, or rather *rollers*, were two feet diameter, and 16 inches tread, ſawed out of oak. They performed admirably, except when running over old cornhills: they then jumped continually. With 4 oxen it carried 120 buſhels of wheat, eaſily. The rollers were under the body; and this was nearly ſquare with equal ſides.

This cart is 5 feet long: $3\frac{7}{12}$ broad: 2 deep; equal to 36 cubic feet.

The ſtrength of a common *man*, walking *horizontally*, with his body inclining forwards, is ſaid to be equal to 27lb. If he walks backwards the force is ſaid to be greater; at leaſt in rowing, when the man fetches his oar from before backward: and it is ſaid to be known that a horſe draws *horizonially* as much as ſeven men; and that conſequently his ſtrength is equal to 189lb, when drawing *horizontally*. Yet in *aſcending*, three men laden with 100lb, each, will go up a pretty ſteep hill with more eaſe and expedition, than a horſe laden with 300lb.

I have often ſeen about a tun weight drawn, and ſometimes up a trying hill, as from Market ſtreet wharf, Philadelphia to Front ſtreet, by *one horſe in a dray*, having wheels of three feet diameter. On level ground, with ſuch low wheels, his whole power is exerted to advantage; *upward*,

from the centre of the axis which is below his point of draught. Horizontal draught, has but 189lb of power to be added to ſome portion of the horſe's weight. But in drawing upward it is with an increaſed power. Contrary to common reaſoning, a horſe draws more in a dray having three feet wheels than in a cart having five feet wheels, or elſe I muſt ſtrangely be miſtaken in my judgment of what I have ſeen and concluded were facts. The line of draught, *from the axis* of a three feet wheel, is *elevated;* which gives the horſe a *lifting* purchaſe, with the aid of his legs, and better foothold preſſing more directly on the ground: but when the wheel is five feet high, the *draft* is in a line nearly horizontal, and the horſe pulls to diſadvantage *with a horizontal exertion of the footlock;* which is very inferior to the power exerted by the *foot and leg*, when drawing *upward* they preſs more *directly on the ground.*

*SHEEP.*

## *SHEEP.*

The univerſal food for ſheep in England, is, in *ſummer*, common graſs and clover; in *winter*, turnips, and from turnips to vetches in the ſpring: hay, only when turnips fail. Of ſtock ſheep, 100 require 5 acres of turnips, and 15 acres of clover. Good incloſed paſture will carry ſix ſheep to an acre. 19 An. 295. 298.—A tun of hay a day was eaten by 700 ſheep; which gave to each $3\frac{2}{10}$ lb a day, and was rather ſcanty. Cabbages are better for ſheep than turnips two to one—After they are a little accuſtomed to their ſtalls, they thrive well. They are there fed 3 or 4 times a day, and have clean litter. 18 An. 105. 111.—The dry climate, and hot air of America is leſs adapted for *cabbages*, than Britain. Plant a cabbage in the ſtep, between every two hills of maize, the partial ſhade may be favorable to them. Thus they are raiſed without labour; for the maize muſt be horſehoed.

*FRESH-*

## *FRESHENING SALT PROVISIONS.*

In my paſſages on the Cheſapeak, I obſerved my ſkipper would ſometimes ſlice ſalted barrel pork, and in a few minutes freſhen the ſlices in a frying pan; and then boil them for his dinner. The pork ſlices were put in freſh, cold water, in a frying pan, and held over a fire till the water *began to ſimmer* (never ſuffering it to boil in the leaſt). This water was then thrown away, and other cold freſh water was put in a pot together with the ſlices of pork. They were then boiled till enough.—This was applied, in my family, to freſhening ſalt fiſh; eſpecially cod ſounds; and it anſwered admirably. Sometimes they were ſo over freſhened, that it was neceſſary to eat ſalt with them.

## *TURNIPS.*

In Kent's Hints, page 128, is the following, on turnips.—In crops, they anſwer three great purpoſes: to *clean the ground:*

*ground:* to *ſupport live ſtock*, a vaſt deal: and to *prepare for other crops;* particularly for barley and clover, or graſs-ſeeds. The turnip crop is the Norfolkman's ſheet anchor; and he ſpares it no pains. The ſtubble of wheat, barley, or oats, is preferred for bringing on turnips. They plow very ſhallow; ſo as to ſkim off the rough ſurface only, ſome time before Chriſtmas. In the following *March*, it is well harrowed (their ſoil is a ſandy loam) and then is croſs plowed to its *full depth.* In *May*, it is plowed again, the ſame depth: and if dry weather and the ſoil ſtiff, immediately *harrow* after this plowing. By the *firſt of June*, it ought to be perfectly clean. Now, 10 good cart loads of *manure* are laid on an acre, regularly ſpread, and plowed in quite *freſh*, half the depth of the other plowing. —It thus is left till about the *21ſt of June;* and then is well *harrowed*, to blend the ſoil and manure together.—It is then *plowed* to its *full depth*, and harrowed, once only, the way it is plowed.—The ſeed is then immediately ſown, on the *freſh* earth; *not*

*even*

*even waiting for the plowing a ſecond ridge.* A quart of ſeed an acre is ſown. The ſeed is *harrowed in*, only twice, the ſame way as the ground is plowed. The *harrow* is ſhort tined, and the lighter the better.

The niceſt part of the turnip huſbandry now remains to be obſerved: It is *hoing;* without which *all* the former labour is *thrown away.*—When the plants cover *three inches* in diameter, *hoe* them with a 10 inch hoe; and ſet them at 15 inches apart; without regard to the apparent health in the choice of thoſe left. About 10 or at moſt 14 days after the firſt hoing, the ground is *hoed* a ſecond time, ſo as to *ſtir the mould* effectually between the plants, and to check weeds. About 14 to 20 days after the 29th September, the turnips are fit for conſumption, and ſo to April, unleſs the froſt injures them.—Where the land is *wet* the *whole* are *drawn*, and fed in cribs. On *light dry land*, every other ridge is drawn.

He

He adds that 20 acres of a good crop of turnips, *fatten* 15 or 16 bullocks, and *ſupport* 10 followers or ſtore cattle, for 25 weeks; or of ſheep, as 8 to one bullock. But the greateſt advantage is in *cleaning*, *meliorating* and *preparing* the ſoil for other crops.

To ſave turnips in the field, they ſink ſome beds in the ground where they grew, about two feet deep, of a conſiderable width, and lay 5 or 6 layers of turnips in them, one upon another, with a little *freſh earth* between each layer; and cover the top over with ſtraw, to keep out the froſt. Or pile them up in ſmall ſtacks, with the greens outward, and a little clean ſtraw between each layer; and laſtly cover or ſkreen them with wattles lined with ſtraw.*

*TREADING*

* At Wye, with intention to try a new mode, my turnips were ſown in broad-caſt, thick. A plow having a narrow fin was run through the young plants, carefully, for leaving them on narrow ſlips of earth. Handhoes followed, working acroſs the rows, and cutting near a foot width of the plants quite up; the hoers ſtooping occaſionally to thin the cluſters of turnips left by the hoes. Ad-

## *TREADING WHEAT.*

A Houſe in the middle of a treading floor, gives ſome ſhade to the track on which

vantageous as this proved, I could not procure it to be obſerved more than once more, a few years afterwards. Overſeers are as fixt to old habits as the negroes under them; and I was much abroad on other buſineſs. I have indeed always found the negroes better diſpoſed to execute my deſigns, than the overſeers, who invariably are attentive and ingenious in taking ſhort cuts for ſlurring over all work, to ſoon get rid of it. I uſually ſowed near the end of July though I felt diſpoſed to break through the practice; and ſow *a little later*, for ſaving them before they were old in growth when they incline to be open and ſpongy, and therefore do not keep ſo well as younger turnips, cloſe and in full vigor. In that country turnips are but little hoed and that ſlovenly: and to thin the plants the country people think would be deſtroying what they had done. They count the turnips by the *number* of plants, rather than by the *quantity* of the roots.

Turnips in rows, leaving 12 or 14 inch intervals. Every other row taken up and ſaved, would leave intervals 24 to 28 inches wide. Cover the remaining turnips with long dung: then, in middle of November, dip deep a double mould board plow, and heave the earth on the turnips, to ſtand the winter. Make the experiment. Such a plow is highly valuable on many occaſions. It eſpecially ſaves 2 or 3 bouts in clearing out, when plowing maize.

which the wheat is ſpread, to be trod out; which is diſadvantageous. The treader of wheat *dreads ſhade;* and invites the greateſt *heat of the ſun*, as being eſſential for treading to advantage. A houſe on the *ſouth* or *north* of the floor, with one end near the periphery of the track, is as much preferable to a houſe in the middle of the circle, as this laſt is to a houſe covering the whole circle, where the horſes are more worried whilſt treading under cover, the wheat alſo being ſhaded, than if they trod altogether in the hotteſt ſun. The hotter the ſun, the ſhorter the work, and more perfectly finiſhed. The houſe being on the *north* of the circle, caſts no ſhade. The floor and the wheat are fully *expoſed to the ſun;* which is the firſt wiſh of experienced treaders: and for all purpoſes this houſe is here as well placed as if it was within the circle. In my deſign of a farm yard plate the treading floor and barn are ſo ſituated.

*MANURING*

## *MANURING ORCHARDS.*

When a boy, I obſerved that hogs were much in orchards; and then apple trees in orchards bore better, and appeared much larger and more perfect than at this time. Hogs feed on potatoes. If orchards were planted irregularly with potatoes or Jeruſalem artichokes, and hogs turned on them when ripe, two valuable purpoſes might be anſwered: their *dung* ſecured, and the ground *ſtirred*; the turning over whereof buries and ſecures the dung to the ſoil.

## *PORK KEPT FRESH A YEAR.*

A Mr. Poultney, of Philadelphia, dined on board a Spaniſh ſhip of war, at the Havanna, and ate of boiled freſh pork which appeared as if juſt killed. He was told it was killed and put up near a year before, at La Vera Cruz. The bones were taken out, and without any ſalt, the pieces were covered with Spaniſh brown (a red ochre).

It

It was then packed in bags, for the officers. They ſhewed him ſome in bags, where they were ſmothered in red ochre: which is waſhed off with warm water, previous to boiling it. I preſume any other pure, impalpable, and dry aſtringent clay would anſwer as well. Some clays ſo far partake of alum, as to ſhew it exuded, like a white mould. Such I have ſeen and taſted on the banks of the Cheſapeak. Does the Spaniſh brown contain alum?

## *BARRELED BEEF.*

Being at an inconvenient diſtance from market, and ſeldom able to ſell my beeves, I found it adviſable to depend rather on barreling up from the graſs, than on ſelling on the foot. From ignorance of a proper mode of performing the buſineſs, part of my beef in the firſt attempt ſpoiled. On four years experience, I prefer the following; which procured a good character to my beef, at market. I killed between 24

and

and 30 beeves, yearly, the laſt week in October, from the graſs.

The beeves may be kept up from food and drink, two days: the better if cloſe and dark, and then ſlaughtered; and by ſo faſting are found to *bleed better*, are handled *lighter and cleaner*, and every way *look better*. Previous to this practice, I found that upon the firſt ſalting and the meat lying in open barrels, *four* days, there has been drawn out by the ſalt, 8 *gallons of bloody juices* from 432lb of beef. This is of the nature of pining of herrings, by the Dutch. Compare that with this method of *ſalting* and *curing*.

The *barrels* are to be ready, ſweet and well trimmed; and the *ſalt* previouſly waſhed or refined, and ground ſmall, before the beeves are to be ſlaughtered.—I killed 14 beeves as *to-day*, and ſalted them to-morrow morning. *Delay* in ſalting is injurious: ſo is expoſure to the air, even after it is ſalted. The pieces are therefore packed

packed into the tight barrels piece by piece as they are ſalted; inſtead of bulking them on a frame or dreſſer to drain, as had been the practice: and inſtead of remaining two weeks to drain, expoſed to the air, they are now 6 or 8 days left to drain, in cloſe barrels, headed up tight.

Having thus ſecured the firſt day's beef, in barrels, to drain (or pine); on the third day, other 14 beeves were killed, and managed in the ſame manner.

Coarſe ſalt, *waſhed* but not ground, having alſo been previouſly ready, is diſſolved in fair cold water till no more can be diſſolved on ſtirring. Let it ſettle a day or two: ſkim off the top: pour off all but the dregs. When perfectly *cool* and *clean*, it is ready to be poured on the repacked beef.

The meat is to be taken out of the barrels; *reſalted*, and cloſely *repacked* in the ſame barrels. Immediately head them up perfectly

perfectly close; and they remain so. In a few days afterwards, bore a hole in one of the heads, or the bulge, of each barrel, and fill up the barrels with the *prepared* and *boiled juices of the meat*, saved from the first salting and barreling, as under mentioned. Every time of filling, the barrels being rolled leaves room for more liquor. When there is no more of the prepared juices, the barrels are next to be repeatedly filled with the plain strong brine, made as above, from the washed coarse salt, till they can take no more after standing a while.

I believe the *juices* of meat *cured* with salt, and then *boiled*, are of an excellent mellowing quality. All that can be saved, is therefore to be so boiled, and poured cold and clear on the meat in the barrels. When animals fast long, the blood and juices retire from the extremities to the large blood vessels in the centre of the body, in proportion as repleniſhment is withheld and the animal is weakened. Hence

Hence it is that the animal bleeds ſo much freer, and more plentifully, after long faſting. Here as in preſerving fiſh in barrels, the operations are diſtinctly, to *ſalt*, and to *cure*. (See the Dutch mode of barreling herrings, page 467) and the *boiled juices*, from the ſalted meat, muſt ſerve to beef what the pickle of fiſh cured is to the herrings. On boiling the blood and juices with the pickle, the firmer parts ſettle in a maſs on ſtanding, and the liquor pours off clear.

Let not the barrels of meat be expoſed to the ſun, as is often the caſe, by rolling them out of doors and leaving them there longer than need be. *Damp*, is bad for ſalt meat as well as for freſh; therefore ſtore the barrels in a *dry* place, the *cooleſt* to be found.

## *FALLOWS.*

Mr. *Forbes* has a good chapter on fallows: and the Bath Letters ſpeak of a com-

parative experiment between fallow left *rough* from the plow, through winter, and ſome that was harrowed after the plow. This laſt proved much the beſt in a barley crop ſowed the following ſpring. In an entire field of wheat, a part of the ſeed was plowed and then *raked* in; another part *handhoed* after being plowed in, as uſual when ſown amongſt maize plants; and a part left *rough* after being plowed in. This laſt was ſo ſuperior that (and from other particulars and inſtances of ſmooth dreſſed ground compared with a part in its rough ſtate as left by plowing in the grain) I afterwards generally left my wheat untouched by rake, harrow, hoe, or roller. On the other hand it proved on an experiment I made, that a part fallowed and then harrowed ſmooth and ſo left through a winter, was preferable to what was left rough. Such, ſo far as theſe experiments were made, is the difference between *fallow* and *ſown* ground being *ſmoothed* or left *rough:* the ſoil a clay-loam.

*LETT-*

## *LETTSOM'S YEAST.*

Doctor Lettſom in his Hints for promoting Beneficence, ſays—" Thicken 2 quarts of water, with 4 ounces fine flour: boil it half an hour. Sweeten it with 3 ounces Muſcovado ſugar. When *almoſt cold*, pour it on 4 ſpoonsful of yeaſt into an earthen or ſtone jar, deep enough to allow the yeaſt to riſe: ſhake it well together, and place it a day near a fire: then pour off the thin liquor at top: ſhake the remainder, and cloſe it up for uſe. It is to be ſtrained through a ſieve. Keep it in a *cool* cellar, or hang it ſome depth in a well.—Some of it is to be *kept*, always, for renewing or making the next quantity wanted."

I had a German brewer, in my family, who uſed to keep family yeaſt in a caſe bottle; and he poured half a gill of brandy, very gently, to float on the top of the yeaſt, in a caſe bottle containing about two

quarts, for excluding the air. Whenever he found his yeaſt was inclined to be flat, he mixt in it half a gill to a gill of brandy, according to the quantity of yeaſt left in the bottle; and letting it ſtand a while, ſhook it up again and then uſed it. The beſt brewers *ſtrong beer yeaſt*, I preſume ſhould be begun with: and then a good bodied rich yeaſt may be kept up, by renewals.

## *POTATO-YEAST, by Kirby.*

The principles in this, are allied to thoſe preparative for producing Anderſon's potato ſpirit. Kirby recommends the *mealy* ſort to be boiled till thoroughly ſoft; maſhed till very ſmooth; with hot water put to the maſh, till of the conſiſtency of beer yeaſt, and not thicker. To every pound of potatoes add two ounces of coarſe ſugar or melaſſes. When but juſt warm, for every pound of potatoes, ſtir in two ſpoonsful of yeaſt, and keep it gently warm till done fermenting. He ſays, a pound of potatoes yields near a quart of yeaſt, to keep

keep three months: and he directs that the dough lie eight hours before it be put to the oven. This ſhews that the ferment, however ſure, is ſlow. I would have the potatoes to be both thoroughly *ripe*, and well *ſprouted;* for the reaſons mentioned under the head of potato ſpirit.

## *BUTTER POTTED.*

The method is recommended, and is promiſing without my knowing of it being practiſed:

Beſt common ſalt two parts
Sugar one part
Salt petre one part: beat them together, blending them completely. One ounce of the mixture, for every pound of butter, is mixed and well worked into the butter; which is then put up cloſe for uſe.—It is ſaid, a comparative experiment has been made of it, with butter only ſalted; and its ſuperiority was vaſt:—That, cured with the mixture being of a rich marrowy conſiſtence, and fine colour, never having a brittle hardneſs, nor taſte of ſalt: and at three

three years old it is found perfectly ſweet. —It is to ſtand 3 or 4 weeks before it is ripe for uſe: the ſalts will not be ſooner blended. 1 Rep.

## *CASTOR OIL.*

Though this mild family purgative is produced in quantities in ſome of the iſlands in the Weſt Indies, yet it is ſometimes hardly to be got in the ſhops, in the United States, or is very ſtale. It is produced from the ſeeds of the *Palma Chriſti* plant, common in our gardens.

Strip the nuts of their huſks. Boil them in water; and as the oil riſes ſkim it off. When it yields no more to the water, preſs the grounds wrapped, looſely, in a coarſe cloth. This oil is ſweet, without bad taſte or ſmell, and as clear as olive oil. *P. Labat.*

## *TURNIP-FLY.*

It is ſaid to be a ſucceſsful method of avoiding damage to young turnip plants by flies, to mix every two pounds of ſeed with a quarter

a quarter pound of ſulphur in fine powder, to ſtand ten or twelve hours; and then ſow the ſeed. Quere: would wheat, when the ſeed has been ſo treated with ſulphur, avoid the Heſſian-fly?

## *CHEESE.*

Mr. *Twamley* was many years a great dealer in cheeſe, annually viſited the dairies of Gloſterſhire, Wiltſhire, &c. and bought the cheeſes of entire choice dairies. He made obſervations on the practices of the cheeſemakers; and ſays that the principal faults in the cheeſes of thoſe countries, made in inferior dairies, were their being hove, ſpongy or full of eyes, whey-ſprings, ſhakes, ſplits, looſe or made of unſettled curd, rank or ſtrong, flying out or bulged at the edges, dry-crackt or huſky coated, bliſtered coats, blue pared or decayed, ſweet or funky, ill-ſmelling from tainted maw-ſkins.

A very great fault is the *haſtily breaking* and *gathering* the curd, and in the *ſetting* it;

it; each of which requires minute attention and *full time.*

Driving cows far, or carrying milk far, retards the coming of the curd; ſo much ſo that inſtead of an hour or two, it will require three, four, or five hours; and even then the curd is in ſo imperfect a ſtate as to occaſion the cheeſe heaving, puffing up or ſplitting: and it will not anſwer to add more rennet for quickening the coming of curd that is too ſlow.

The proper warmth of milk when receiving rennet is only milk warm; or perhaps rather about 85 or 90 degrees of Farenheit. If it is too cool, add ſome warmed milk, but let it not boil in warming. If it becomes too cold after the rennet is put to it, add *hot water when the curd is nearly come;* which will give a due firmneſs to the curd. But it is of importance that, before the rennet is put to the milk, there be thrown into it at the rate of two handsful of *ſalt* to the milk of ten or twelve cows; which

which will tend to make the rennet work quick, prevent ſweet or funky cheeſe, make the cheeſe all alike ſalt, and prevent ſlip curd, by occaſioning the curd to be firm and ſink readily and equally. Mr. *Marſhall* ſays, for making the curd come all at the ſame time, cover the milk with a cloth whilſt the rennet is in it.

The great fault, continues Mr. *Twamley*, is in diſturbing the milk too ſoon, before the curd is perfect. It is firſt a weak ſoft curd called ſlip curd; in which ſtate it is unfit for making good cheeſe: when it ſtands ſufficiently long after this ſtate, it becomes a firm perfect curd fit for cheeſe. In whatever ſtate it is when it is firſt broke or ſtirred, in that ſtate it will continue; and can never be made better by adding rennet or other means.

Neglect not to put *ſalt* to the milk when the rennet is about to be applied; and inſtead of an hour let the curd be undiſturbed during one and an half or two hours, or more

more if requiſite for obtaining a full, firm, and perfect curd;—and *ſink* the curd with a ſifter rather than break it. For ſinking it, a long wooden or lath knife is to cut the curd from top to bottom, croſſing it many times: then with a ſieve preſs it down: when having ſettled it well down, let it *reſt* a quarter hour. The whey being laded out, the curd lies ſolid: then *cut in ſlices*, and work it into the vat with as little breaking it as poſſible. Breaking it ſmall in the tub and into the vat reduces the cheeſe in quality and alſo in quantity; for the fat is thereby ſqueezed out.

There are he ſays, perſons making good cheeſes, who might make better and more, if they did not *ſqueeze out* ſo much of the fat in breaking. The whey that firſt comes is the thinneſt. If that thin whey was firſt *ſeparated* before *breaking the curd*, it would leave the cream in the cheeſe, with the loſs of but very little ſqueezed out in putting it in the vat: but when broke ſmall amongſt the whey the rich parts are ſqueezed and waſhed

waſhed out among the thin whey. Where there are bits of ſlip curd floating on the whey, they are taken off and carried away with the whey, as they would damage the cheeſe. The beſt cheeſemakers let the curd ſtand *two hours* inſtead of one and an half; by which the curd becomes ſo firm and perfect that it needs no more than to be cut and ſliced, put in the vat cloſe packed, and then to the preſs. A good whey is greeniſh: if white, all is wrong. It is reckoned on, that the milk requiſite for making one pound of butter, will yield two pounds of cheeſe.

## *RICH CHEESE.*

New milk makes the fine cheeſes for market, without any addition of cream: but a rich cheeſe for high days, may be thus made: " a meal extraordinary of " cream is added to new milk. Care muſt " be obſerved that the curd ſhould not be " ſunk in leſs than two hours: two and an " half or three hours may be better."

*SLIP-*

## *SLIP-CURD CHEESE.*

" To ſix quarts of new milk hot from the cow, the ſtrokings beſt, put two ſpoonsful of rennet, to ſtand three quarters of an hour, or until the milk forms a ſufficient ſlip-curd. With a ſpoon lay it in the vat, without breaking it, and place a trencher or flat board on it. Preſs it with a four pound weight; or if it inclines to be hard, a lighter weight, turning it with a dry cloth once an hour; and when ſtiff ſhift it daily into freſh graſs or ruſhes. It may be cut in ten or fourteen days. Its beſt condition is to have it run or diſſolve into a creamy conſiſtence." Nothing but weak half formed curd called ſlip-curd will produce it. It is the cream cheeſe of Philadelphia.

## *RENNET-BAG* OR *MAW-SKIN.*

" Rennet is the produce of the ſtomach of a calf that has fed on milk only; and the calf

calf killed before the digeſtion is perfected. Though this rennet readily coagulates milk, yet if put to milk already coagulated, it then diſſolves it.

" Soon as the maw, taken from the calf, is cold, ſwill it *a little* in water: then rub it well with fine powdered ſalt; next fill and cover it with ſalt. Some cut the ſtomachs open and ſpread them in ſalt, in layers one over another, and let them lie in the brine they produce; ſometimes turning them, four, ſix, or nine months: then they dry them ſtretched out on ſticks. When dry, uſe them. They are beſt to be a year old when uſed. Keep them diſtant from fire, for avoiding rancidity." *Twamley*. A *dry* cool place is beſt.

## *RENNET-LIQUOR.*

" Take two ſkins to a gallon of pure ſpring water: the water having been boiled and made into a brine that will ſtrongly bear an egg. When the brine is made

blood

blood warm, cut the ſkins into pieces, and ſteep them in the brine twenty-four hours. It may then be uſed; about a tea-cup full to the milk of ten cows: but obſerve that a juſt quantity be applied: for if too much the cheeſe becomes ſtrong and liable to heave; if too little the cheeſe will be mild, but the curd will be a long while before it can be properly broke or ſunk, and may become damaged before it is committed to the preſs. The liquor is kept cool in jars or bottles. The Bath Letters ſay, in the brine boil ſweet briar leaves, roſe leaves and flowers, cinnamon, mace, cloves and other aromatics, briſkly till a fourth is reduced: pour it *milk warm* on the maw and ſlice a lemon into it. Then ſtanding a day or two, it is ſtrained and bottled cloſe." *Twamley.*

## *MANURE.*

The headlands of arable fields, along the ſides of fences, accumulate ſoil from the fields on every bout of the plows. This accretion

accretion of ſoil confines water on the fields ſo as to chill them, and damage growing crops. For reducing this miſchief and increaſing manure, plow up a portion of the headland and then pen cattle on it, till it becomes very rich with dung and urine. Then having another portion recently plowed, pen the cattle on this in like manner; and the former portion is again plowed for covering the dung and mixing it with the earth; which is then either immediately carried away, and as a manure laid on other ground, or heaped up high and covered from the ſun, to remain ſo till wanted for manuring ground. During the ſummer, and till cold weather forbids, other portions of the headlands are to be plowed and penned with cattle in the ſame manner in ſucceſſion.

## *BUTTER.*

The following method of making butter has been recommended, from the practice of a butter maker: though the exact particulars

culars are not all certainly remembered. The churning was in the *evening*; and when the butter was come, the milk was drained off; and then the maſs of butter was put in a wooden tray or bowl; and a good quantity of fine ſalt was thrown over it, to remain undiſturbed in a cool place till morning. In the morning it was again drained, and daſhed with cold water for waſhing off the remaining ſalt and milk. It may be next dried by a ſoft cloth abſorbing the remaining moiſture; and without ever wetting it again, ſlowly work it, and put it up for uſe. The beſt butter I ever ſaw, had never at all been wet with water; as I was ſatisfactorily aſſured.

## *GRASS*,

——Is the *ſine qua non* of LIVE-STOCK! the eſſential of DUNG! and therefore the nurſery of CORN, and of all FARMING PRODUCTS!

*HEAT*——

## *HEAT — ICE.*

When we entered the Seminary at Syracuſe, ſays Count *Stolberg*, the heat was not extreme; but when in leſs than an hour we returned, it met us *hot* as if it came out of an oven, we being then in the open air, unprotected by ſhade. It continued thus hot about three hours. We were adviſed to *ſhut up* our windows, leaving only light to read by, and *ſprinkle our rooms with water.* The air in the houſe thus became ſupportable.' Farenheit's thermometer aſcended from $81\frac{1}{2}$ to $101\frac{3}{4}$ degrees. We durſt not leave the houſe all the afternoon; but *cooled* ourſelves with *ice;* and ſtrengthened ourſelves with wine. The practice of taking *ice*, in Italy and Sicily, is conſidered as an indiſpenſible refreſhment; and as a powerful remedy in many diſeaſes. The phyſicians of theſe countries do not give many medicines; but frequently direct a ſevere regimen: and prevent the ill effects of various diſeaſes by ſuffering the ſick, for ſeveral days, to take

nothing but *water cooled with ice*, ſweet oranges, and *iced fruits.—Iced milk*, *fruits*, *chocolate*, and other iced viands, are found in moſt of their towns. They prefer *ſnow*, as it is more eaſily preſerved than ice. The *ſnow* is *cloſely* packed together, and covered with ſtraw.

## *POTTERY.*

The earthen ware made in America, is *glazed with lead:* and it is laid on very ſavingly, thin and ſlight: ſo that it is not only worn away by vegetables and every thing acidulous, but is apt to ſcale off, and be ſwallowed with meat, greens, and drinks. It is pure *lead*, and conſequently a ſtrong *poiſon*. The effect of lead on the health of glaziers and houſe painters, is daily ſeen. A journeyman or working painter may live, continually dying, ſix or eight years as a large allowance. The maſter who ſees that the work is done, and works but little, lives longer. All are groaning and pining, under colicks, gripes, cramps, rheumatiſms,

aches

aches and pains, who continue to ſnuff up and inhale the vapours of lead for ſome time; or who gradually ſwallow ſmall portions of it with their milk, greens, cider and drinks, diffuſed from the glazing made of *lead*. The people of New-England, drink much cider, and uſe much vinegar, in country families; and there have been inſtances of whole families afflicted as above.*

Lead requiring but little fuel to melt it, is the cheapeſt or eaſieſt material for producing common glazing. It is therefore impoſed on the inattentive people of the

 country,

* Doctor Fothergill ſays, *lead* is a ſtyptic, injurious to the *nerves*, and thence ſuppreſſes the natural inteſtine *diſcharges*; produces obſtinate *coſtiveneſs*, and a peculiar *colick* with *palſy* of the extremities: occaſions alſo *paleneſs*, *contraction* and *waſting* of the *muſcles*, *numbneſs*, *tremors*, *langwors*, *convulſions*, *epilepſy* and *death*. Sometimes it occaſions only a *ſlow*, *lingering indiſpoſition*, *for ſome* years. It thus acts like the ſlow poiſons of the ancients.—New rum, he adds, is unwholeſome from the lead of the worm, which is corroded: but in old ſpirit, the lead has chiefly depoſited.

country, who buy the ware without knowing its fault, or without caring for it: and this lead is imported from foreign countries; whilſt the country abounds in materials for producing the moſt perfect, durable, and wholeſome glazing. Theſe materials are *wood-aſhes* and *ſand*. On converſing with a potter in Philadelphia, his objection to the uſe of theſe materials was their requiring more labour and fuel; but if I would prepare them for glazing any pieces I might want, he would lay them on, and find a place in his kiln, for giving a good glazing. If legiſlators were duly ſenſible of all this, their energy might find means for cauſing the change from *lead* to *ſand*, for glazing earthen ware; and of courſe, for protecting the health of the people.

A young man of the name of Cook, a brickmaker, in the time of the revolution war, informed me he would erect an earthen ware manufactory, if he knew how to glaze the ware. Having a ſmall air furnace, for my amuſement, he ground ſome

ſome ſand, and made ſmall clay cakes. The glazing materials were prepared, and laid on the dry cakes: and being fluxed in the furnace, the glazing was very ſatisfactory to him. He then got ſome fine *potters clay* out of my bank, and made a number of little cakes of it, mixt with various proportions of *ground ſand*. Theſe were burnt in the furnace; and one eſpecially was a ſpecimen of a very excellent *ſtoneware:* which is vaſtly preferable, in its qualities, to earthen ware; and is greatly wanted in America. The heavy freight paid on ſo *bulky* and *cheap* an article of imported merchandize, renders *ſtoneware* ſcarce: and gives an inviting opening to induſtrious manufacturers of ſtoneware, in America.

## *SEASONING WOOD.*

Wood ſeaſoned by the *air* is left in the ſame ſtate as if ſeaſoned by *water;* which is with the loſs of its ſap or juices, being waſhed or evaporated away. It is ſooner effected by water than by air. The wood, then,

then, only conſiſts of its fibrous and ſolid parts; which are conſiderably concentrated by being dried: yet the maſs is not without numerous interſtices, from whence the ſap had been expelled by the air or the water. In dry weather theſe only contain dry *air:* but in moiſt weather they become charged with humidity from the atmoſphere, to ſuch a degree, at times, as to ſwell and even burſt boards ſo ſeaſoned.

Shrinking and ſwelling of boards happen according as moiſture is abſent or preſent. If ſeaſoned wood can be defended from the impreſſions of water, it never will ſwell. I effected this when painting a landſcape at my fire ſide on ſeaſoned poplar, which warped or became ſtraight according as were the changes in the ſtate of the atmoſphere. I covered the back the ſides and the ends well, with painters drying oil, at a time when the board was ſtraight, and it never afterwards warped.*

Wood

* "Equal parts of roſin, turpentine, and bees wax were melted together, well ſkimmed, and with a bruſh

Wood ſeaſoned by *fire* with *quickneſs whilſt full of ſap*, does not imbibe water, as air and water ſeaſoned wood; becauſe, as it ſeems, the ſap is inſpiſſated by the *ſudden* heat ſo as to fill or moſtly fill up the interſtices; and being ſo fixed and hard, it excludes water. The ſap is thus cured, and prevented from fermenting and rotting the inſide of the wood, and from flying off in vapour.

A pair of cart wheels, ſoon as made were tarred over thick and ſet up reſting on the ſide of a houſe a year or two. When put to uſe the fellows broke, and ſhewed a ſound external ſurface, and the reſt was a dark, rotten, coarſe powder. Here the *unſeaſoned* wood being coated over ſo as to obſtruct the ſap from evaporating, the ſap *fermented*, it is preſumed, and rotted the inſide of the ſolid parts of the timber: the ſhell

laid boiling hot on a board 6 feet long, 18 inches wide; which was kept in water 19 months, without having imbibed any water, or having its coat of cement damaged." 2. Rep.

ſhell or outſide of the timber having been ſeaſoned, or loſt its ſap, before the tar was applied. In foreſts, I have ſtept on the bodies of proſtrate trees, which appeared ſound to the eye: but have broke through the ſeaſoned cruſt to a maſs of rotten powder.

On the other hand; ſleeping in the room of a hip-roof, of a one ſtory brick houſe then lately built by a Doctor Wharfield, of Elkridge, Maryland; in the morning I admired the wainſcoting and ceiling of the room, which were made of poplar boards; in which the joints could not be eaſily diſcovered. The work was not painted.—I ſuppoſed the boards had been many years ſeaſoning in a tobacco houſe. The doctor pointed to two lengthy pits, on the ſide of a hill; and ſaid the trees were fell, and cut off into logs, which were immediately hauled to the pits, over one of which a log at a time was ſawed into boards or planks, and immediately, whilſt *full of ſap*, a fire was made and kept burning under the ſtock till

till the boards were cured; and that ſome of the wainſcot was put up within two weeks of its having been in the growing tree. The pits were alternately applied to the ſtocks to be ſawed, and the ſtocks to be fired.

Recommending to a ſhip carpenter, the trimming timber roughly in the woods, and there ſeaſoning the pieces by fire, he objected it would render the timber hard to cut and dub. Perhaps too ſome might think it would render the timber too durable. It may be proper to contract for its being ſo ſeaſoned: eſpecially for national ſhips.

*Melaſſes* and Muſcovado Sugar Cleanſed.*

Weight, 24 melaſſes; 24 water; 6 charcoal thoroughly charred. Bruiſe the charcoal groſsly. Mix the three articles in

* A ſyrup of the conſiſtence and ſweetneſs of *honey*; and produced by the labor of *aſſes* in grinding ſugar canes: thence melaſſes from *mel* and *aſinus*.

in a caldron; letting the mixture boil, gently on a clear woodfire, half an hour. Then pour it through a ſtraining bag; and place it again on the fire, for evaporating the ſuperfluous water, till the melaſſes is brought to its original conſiſtence. The loſs is ſcarcely any. 2. Rep.

## *SALTING AND CURING MEAT.*

According to 14 An. pa. 267. meat for family uſe, in England receives 1 ℔ of ſalt and 1 *oz.* nitre to every 14 ℔ of meat. The ſalt and nitre to be beat *fine*. Rub them well into the meat. Lay the pieces on each other, during a month, and turn them once a week. Then drain, and ſhake bran [perhaps impalpable clay or ochre] over them, for abſorbing the moiſture. Hang the pieces in a kitchen. If the quantity is large, then in a room having a ſtove and flue round it. It is a month in drying—then keep it in an *airy*, *dry* room.—For voyages and hot countries, ſoon as dried pack it in *ſaw-duſt*, ſtove dried. *Moiſture*

is

is more to be apprehended than heat. In common the longer meat is kept in brine the ſalter it is; but in this method it never varies.—Salting for *ſhip uſe* the ſalt is 1lb to 8lb of meat; beſides ½ inch thick of ſalt in packing. See p. 453. and of Pork cured in ochre page 492.

## *MAIZE.*

Farmer *Shephard*, of New Jerſey, informed the Burlington ſociety of agriculture, that in autumn 1786 he collected, for ſeed to his next year's crop, a quantity of corn produced *on ſtalks which produced two ears.* The crop from that ſeed, was increaſed much beyond what he had been accuſtomed to, even to 10 buſhels an acre: and by following the ſame rule in ſaving ſeed, his crops increaſed to 60 buſhels an acre; with three or four ears upon a ſtalk.

## *WASH, FOR BOARDS OR STONE WORK.*

In Nova Scotia they waſh rough boards, the rougher the better, with a mixture of ſtone

ſtone lime ſlacked with boiling water, whiting, alum, common ſalt. The *alum* is an excellent article for *binding*; ſalt alſo would be unexceptionable, but that it attracts moiſture and *gives*; as it is called. The above promiſes to be a good *white-waſh*.

A *Black-waſh*, which I have experienced effectually reſiſts water, is made of tar three or four parts, and fiſh oil one part, intimately mixed in a pot over a ſlow fire; which is laid on hot with a bruſh. Such bruſhes, bound with iron rings, are to be got at ſhops for ſhipping.

A *gray-waſh* may be produced, by adding more or leſs of the black-waſh with the whitewaſh: but I would omit the ſalt, as doubtful; and the alum, as unneceſſary, where ſo binding a varniſh as the black-waſh is admitted.

I have ſeen a ſimple, cheap varniſh of turpentine, uſed in ſhips: but know not how it is made. Perhaps, as that of tar, with

with fiſh oil. This varniſh mixt with the white-waſh, it ſeems would produce a waſh excellent in quality, and of a cream colour.

## *PAUPERS.*

As a forerunner to promoting *employment*, be bold in amending the exiſting regulations reſpecting the poor. Principally provide *checks* on the *magiſtrates* and *overſeers*; who through levity, weakneſs, or other cauſe, ſuffer their country to be ſhamefully abuſed, in at leaſt ſome of the United States: and involve in their *lax* government a marked encouragement of ſome of the greateſt evils that can enfeeble nations or affect mankind—*Idleneſs* and *debauchery*, with their concomitant *wretchedneſs*: for, John will be at *eaſe*—will be *idle*—will be a *fat*; becauſe John can *whine* himſelf into the ſociety of public paupers, and there be provided for, as a drone, at the expenſe of the induſtrious and ſober citizens. The laws provide for the poor,—not for the whining

whining impoſtor: and it is deſirable that they be provided for; but they ſhould alſo be kept to ſome *employment*. Paupers capable of but whittling a ſtick, may be induced to paſs their time in producing toys for other people, as the Germans in Europe are uſed to ſupply our babies, little and big.

A ſteadineſs in work, of any ſort, according to the abilities of the reſpective paupers, would greatly leſſen the public burthen; both by the income gained from it,—and from impoſtors ſhrinking from a compulſive work under *confinement*, when they can, unconfined, find work *at large*.

Want of a right criterion for admitting applicants, to be provided for at the public expenſe, is the principal cauſe of a great number of them being in reaſon, in humanity, policy and in juſtice, *improperly* received. That a man is *poor* is not alone ſufficient cauſe fo the ſervants of the public to provide for him at the coſt of the induſtrious

ſtrious and ſober part of the community: beſides his being in a ſtate of indigence, he muſt be *incapable* of working *ſomehow*, ſufficiently to ſupport himſelf in *neceſſaries*; and alſo he muſt be without any *connexion* capable and compellable by law to provide for him. Indulging a whining drone, *capable* of procuring common neceſſaries by labour, or in any way of employment, is encouraging the *vices* above enumerated; and in effect multiplies *paupers*, *vices* and *wretchedneſs*.

## *SOLID FEET REDUCED TO BUSHELS.*

The foot contains 1728 inches. The buſhel *in uſe* 2183 inches. For the farmer's eſtimates and groſs purpoſes, it will be near enough though not quite exact, to reckon for ſtruck meaſure. The feet ×·8

How many buſhels of wheat will a room of 1000 ſolid feet hold?

·8

800·0 800 buſhels:

which is but about one per cent ſhort.

A cart

A cart body containing 40 feet
8
—320 buſhels,
ſtruck meaſure.

## *MADDER.*

Madder and water-rotted green hemp would be agreeable, as well as profitable crops, for retired cits to amuſe themſelves with cultivating them on their ſmall retreats, if they ſhould wiſh for more than graſs to employ their attentions. Mr. Arbuthnot in England, cultivates the amazing quantity of 80 acres in madder, on his farm of leſs than 300 acres.—In my garden at Wye, I was much pleaſed with the growth and produce of a bed of Mr. Arbuthnot's choiceſt kind of madder; and wiſhed to ſpread the culture of it amongſt country families, who appeared the moſt concerned in little domeſtic manufacturing. But, alas! only one family deſired to have of it; and planted ſome roots, in their garden.

*CELLARS.*

## CELLARS.

It is a general practice, in America, in building habitations to have many windows; and to leave them *open in hot weather* for letting in the air. When in hot weather there happens to be a breeze, ſome benefit is received by the few who can ſit cloſe to the window. But as the air from without is full 20 degrees hotter than within doors, the air looked for brings with it that increaſed degree of actual heat, when the ſun ſhines: yet concentrated in a ſtream as it ruſhes through the windows it relieves perſons on whom it ſtrikes, with ſenſations of coolneſs. But if the houſe is *ſhut up* during the hot ſun-ſhining part of the day, the family feels more coolneſs and comfort than when the windows are open for letting in the wind which is actually hot—and how is it in a time of calm? The having only *a few apertures, in habitations, is advantageous both againſt cold and heat.*

Cellar windows are improperly left open during the whole time of the hot ſeaſon, for letting in cool air: when in fact the air let in is heated above 20 degrees more than the nearly quieſcent air in the cellar.

The following attentions would be preferable to the common practice. *Shut the cellar up* during the hot ſeaſon, from May, till October, *night and day:* or open the windows after ſetting of the ſun, and cloſe them by ſun riſe, *if it be a wet cellar.* The firſt of October the windows may be *left open*, day and night, till the end of November, or threatening of a ſpell of freezing weather: then again *cloſe them*, till about 20th of March or early April; when the windows are left open, till May, as above. Yet, during winter, a few ſmall air holes may be left open immediately under the joiſts of the firſt floor, for preſerving ſome degree of motion, as the life of air, and for a paſſage to muſty vapours of the cellar. The leſs the cellar, under habitations, the more healthful the family.

family. For a few purpoſes a ſmall cellar may be here. For other purpoſes have them under ſome detached building.*

## *ASSES.*

" There are two ſorts in *Arabia:* the ſmaller or *lazy* aſs, as little eſteemed there as in Europe; and a *large and high ſpirited*



* In five ſucceſſive days of June and July, I found the medium mid-day heat of *clear days* was 21½° more out of doors, ten yards north of my houſe and 5 feet above the ground, than in a receſs in a N. and S. paſſage running through the houſe. When *cloudy*, the heat out of doors, as above, was only 3 to 5½° more than in the paſſage. But, theſe experiments having been made in a thick built town, are leſs ſatisfactory than if they had been of heat in the country, where its effects are much more extenſively felt, by huſbandmen, labourers and travellers. In ſuch a nitch or other ſhaded part within doors of a houſe *in the country*, obſerve the degrees of heat; and alſo at five feet above the ground (the thermometer hanging clear of what might add to its heat) of an open *field* or main *road*.

In July, when in-doors the heat was 80° in the back yard north of the houſe it was 100 at five feet above the ground, and at the ſouth door 106° nine feet above the ſtreet.

*breed*, which are greatly valued, and ſold at a full price. I thought them fitter than horſes are. Neibuhr's Trav. in Arab. 304.

## *PEAS AND BEANS.*

Of all the kinds of Indian or Negro *peas*, the cream coloured ſmall round ſort, the ſize of large briſtol or duck ſhot, called lady pea, I prefer and chiefly cultivated. They make excellent ſoup, bear well on dwarfs. If ſown, in Maryland the 10th. to the middle of July, they ripen nearly altogether; otherwiſe not. They were in rows 18 inches apart, and the cluſters 10 inches apart in the rows. The intervals were ſhimmed two or three times: and the plants handweeded and hoed once in the rows.—The ſmall white dwarf or buſh *bean*, proved the beſt of the beans: but I meant to try the large white runnnig bean.

## GATES.

The best gate-ways on my farms, were thus constructed. The posts were sawed square off at the tops; and were but 4 feet 6 or 8 inches high from the ground. The top of each post inclined 4 inches inward toward each other. Their distance on the ground was 9 feet, of course the distance at top was but 8 feet 4 inches: and this inclination seemed to influence oxen and horses, in carts, to take more to the middle of the passage. Gluts of wood, large and stout, were trunnelled to the posts and let into the ground; which served as fenders and braces. These fenders also tended to direct beasts to the middle of the way.

Gate posts ought never to be higher, if so high as the cart wheels; that plain frames holding hay or straw may pass over the posts.

When posts are thus inclining to each other at the tops, the *gates* will be narrower,

er, by 8 inches, at top than the bottom; and of courſe lighter than if of the ſquare of 9 feet, as at the bottom; and as they are opened they riſe gradually from nothing to 4 inches; and then let go, gently fall to their ſtation at the poſt.

My gates had been widened from 10 to 11 feet, by an honeſt Hibernian much my friend, that the carts might be ſure to paſs through without ſtriking the poſts; but alas! the drivers became more careleſs, and the cattle were left to their own bias. Theſe poſts 11 feet apart were more cut than thoſe of 10 feet as the 10 feet were more than the 9 feet. Theſe laſt were indeed ſcarcely touched—the fenders, &c. preventing it.

## *PLOWS.*

A habitual fondneſs for *wheels* has greatly lumbered and depreciated the plows of England. Ingeniouſly built Norfolk wheel plows have been imported into America; but

but were very ſoon laid aſide. In oppoſition to this huge complex machine, the Engliſh Rotheran patent plow is every thing: a ſimple, chip, ſwing-plow with a clean but full bow mould board. The ſhare and mould board are ſuperior for cutting and turning old lay or graſsland: but in horſehoing it is inferior to the common bar plows of Maryland and Pennſylvania, as it requires more uſe of the plowman's hands. The common fault in the American plows is moſtly in the mould board. Almoſt any mould board, would be preferable to the *hollow* fine ſhaped board which the fancy of ſome delight in; as injudicious watermen prefer the ſharp entrance and *hollow* forepart of the bottoms of ſailing veſſels. The plow and the boat have to force their way through reſiſting mediums. For gaining this, ſharpneſs of entrance is all in all with heedleſs fancy.

But what avails this firſt clear entrance, if oppoſition in a more abrupt and direct manner, a little further aft is the conſequence?

quence? View the *hollow* mould board of a ſharp fair looking plow, after it has been worked a while, or whilſt working, what a glut of friction or oppoſition it has experienced, juſt in the hollow, and how it labours through accumulated maſſes of earth unthrown off forward. On the other hand ſee the mould board having a fair eaſy entrance and full bow in a gradual ſwell as it riſes, how it turns off the earth and rids itſelf or avoids accumulated reſiſtance, juſt as a well formed boat does the water; and this with the leaſt poſſible friction or wearing of the mould board! Illuſtration: deſigning to ſpend a winter in Philadelphia, it was propoſed that Mr. *Singleton*, of Talbot, ſhould procure to be made a double plow to carry two furrows at a time, and that I ſhould have one made at Philadelphia, where, in Arch ſtreet, was an ingenious plowmaker. On comparing Mr. Singleton's with mine, the weight of mine ready for work was 96lb, wood and all: his 43 to 45lb. His had the admired fine light *hollow* mould board;

mine

mine the comparatively heavy looking full bowed mould board. My plowmen, were horſehoing maize, when I ordered the two beſt to try the double plows with two horſes to each. Seeing them at work for ſome time, they were ordered to change plows. After working theſe awhile, they were aſked ſeparately, their work being ſixty yards apart, which they liked beſt. It was curious how they for ſome time looked at one and then at the other plow, before they anſwered. Their concluſion, reſpectively, was that the large plow was beſt: but that it was heavy in ſwinging round. It did not appear to them or to me that the horſes exerted more power, or were more worried, in carrying the large than the ſmall plow. The plowmen were obliged conſtantly to preſs on the ſtilts of the ſmall plow, but not of the large one: and whilſt we were talking the horſes went off with the large plow, which followed them ſteadily and without deviation as if the plowman had hold of the ſtilts and leading line, for 70 or 80 yards. Both were

were bar ſwing-plows, for we ſee no uſe in wheels to plows: but the Philadelphia plow had a longer tread. The Talbot plow was ſhorter than common which with the *hollowneſs* of the mould board deprived it of ſteadineſs and a due balance. Neither Mr. Singleton or myſelf gave any direction in making the mould boards.—— Having worked mine one ſeaſon, with approbation and ſome admiration, a new overſeer would improve my large plow, by cutting away the *ſwell* of the mould board and leave it *hollow*, that it might paſs eaſier through the ground. It was done; and the plow performed very indifferently: it was worked thus a few days and laid aſide.

A promiſing *mould board*, formed on mathematical principles, is lately invented by Mr. Jefferſon; of which an account is given in the fourth volume of American Philoſophical Tranſactions, now in the preſs.

*TURNIPS.*

## TURNIPS.

Mr. Amos ſays, "on poor ſoils 10 "inches are the beſt diſtance: on rich ſoils "12 inches, and one inch the beſt depth. "When they ſtand at a greater diſtance, "they grow too large for keeping long. "The ſmaller the turnips the longer they "reſiſt the ſeverity of winter." Too *early* ſown or planted turnips or cabbages do not ſtand the winter well: they are over ripe, ſpongy, and ſuſceptible of froſt; having leſs of the *vis vitæ* of their nature: their vigor is ſpent, which would withſtand froſt. But the more hardy Swediſh turnip, called *ruta-baga*, is ſown in May, for giving the full grown *bulb* in autumn: yet, ſown in June or early July may be better for ſtanding the winter, in the ground.

## CARROTS.

In Mr. Young's Agriculture of Suffolk, it is ſaid the moſt approved method is to leave

leave a barley ſtubble, which has followed roots, through the winter; and about 25 March to plow by a *double furrow* as *deep* as may be; and to harrow in about 5lb. of ſeed an acre. About Whitſuntide hoe the firſt time; and thrice in all, at 4 dollars an acre. The produce on good land, 400 to 500 buſhels: ſometimes 800. On poor ſoils as low as 200 buſhels. The carrots are commonly left in the ground during winter, and taken up as wanted: but in ſome winters they are froſted and rot. The feed is 80 buſhels a week to 6 horſes, with chaff, but no corn; and when ſo fed very little hay is eaten. Yet it is beſt to take the carrots up in autumn and pack them in a barn. There they acquire the *withered ſtate*, in which they yield *moſt nouriſhment*, and late feeding is better than early in the ſeaſon when they abound in water.—Carrots put horſes in better condition than *corn with hay*; and they leave oats for carrots. Feed with them from Chriſtmas till a full bite of graſs in May. One buſhel with chaff is enough for a horſe a day, without corn, and ſaves

half

half the hay. The preparation they give for a ſubſequent crop, fully pays for them.

Mr. Amos propoſes *drilling* carrot ſeeds. Two pounds of ſeed, ſteeped in rain water 24 hours, then laid on a floor till it ſprouts, with three pecks of dry ſaw duſt, and three pecks of fine dry mould, all well mixed together, are drilled, one inch deep and 14 inches between the rows. Thus ſteeped and *ſprouted* when ſown, the plants begin to appear in 8 or 10 days. After drilling, harrow once, with light harrows; and then roll, if the ground is not moiſt. As ſoon as the carrots are about 2 or 3 inches above ground, ſays Mr. Amos, they ſhould be *harrowed*, the horſes walking in the furrows, for avoiding to tread the land and plants. In two or three weeks after harrowing the *ſecond hoing* is given to clear away weeds, and the plants are *thinned*. In 3 weeks again horſehoe the intervals, and handhoe the rows, as well as finiſh the *thinning*. Every other row may be taken up.

up: the reſt covered with a double mould board plow, and long dung.

## *MODES of SOWING WHEAT.*

1. *Broadcaſt:* the moſt ſimple and moſt common.
2. *Drilling, in continued rows;* like garden peas.
3. *Drilling cluſters;* in rows.
4. *Dibbling:* dropping ſeed in holes.

*Broadcaſt* can ſcarcely be hoed at all: nor is it done in crops. Harrowing might anſwer.

*Drilled, like garden peas,* it is *horſehoed* between the rows; and yields more than broadcaſt. *Drilled in cluſters*, it is horſehoed, and may alſo be handhoed. It thus yields ſtill more than the drilled in a continued line.

*Dibbled,* with a number of ſeeds in each hole, is probably the moſt productive: dropping

dropping not leſs than eight or ten grains of wheat to each cluſter.

Mr. *Amos* made a number of comparative experiments, as well of ſeeds ſowed *broadcaſt* as *drilled*: the reſult whereof ſhews, that *drilled* and *horſehoed* grain is ſuperior to *broadcaſt* harrowed and handhoed, by 13 per cent; beſides cheapneſs in the work, and the ground left in better condition. Drilled *turnips*, horſehoed, ſuperior to handhoed 17 per cent; and the work cheaper, with the ground left in better condition. Drilled *potatoes*, horſehoed, ſuperior to handhoed 16 per cent; the work cheaper and the ground left better.

In the above experiments, broadcaſt wheat was handhoed, which it ſcarcely ever is in entire fields of it. If, in the experiment, it had not been handhoed, the ſuperiority of the drilled wheat might have been greater.

From

From experiments made by me at Wye, I eſtimate wheat growing in *cluſters* to be 15 per cent better then drilled wheat in continued rows, both being hoed, &c. alike; which would be $\frac{1}{3}$ or 33 per cent better than broadcaſt wheat not hoed: and the growing crops of *cluſtered* wheat, are the moſt beautiful, the work eaſy, and the products the moſt abundant and perfect!

## *ROTATIONS.*

Mr. *Amos's* are:

| I. | II. | III. |
|---|---|---|
| Oats | Turnips. rot. | Potatoes 12 l. *dung* |
| Cole ſeed, *limed* | *dung* 10 l. | Barley |
| with 144 buſh. | Barley | Clover |
| Barley | Clover | Wheat |
| Beans | Wheat | |
| Wheat | | |

The *lime* ought to enrich greatly: for coleſeed is ſaid to be very impoveriſhing, and beans are the only mild crop in No. I.—So the dung muſt be rich, and the ground previouſly in good heart, in No. II. as 10 loads are rather a ſmall allowance to an acre. The like

like of No. III: but then No. II and III have two mild crops, rather ameliorating, to two exhauſters.

## *DRINKING WATER.*

In low flat countries, and even in ſome diſtricts of higher country, the water of ſprings and wells is bad taſted and bad in quality. What in ſprings is not fluſh but ſluggiſh and nearly ſtagnant, abounds in *putrid* remains of vegetables and inſects; and ſome are continually muddy or milky, as it is called. What are deemed ſprings of good, clear, and ſweet water, in theſe countries, are ſtill but comparatively ſo. They want the brilliancy and the ſpirit of rock water, ſuch as the highlands afford.

If filtering the water uſed in drink was practiſed, it would render what is ſo inferior at leaſt bright and palatable; and probably perfectly wholeſome; eſpecially if charcoal ſhould be applied to it as below.

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Of this and filtering, it may be obſerved that,

Purifying water may be performed in either of the following modes. According to Doctor *Lind*, a ſmall caſk open at both ends, is placed within a larger caſk wanting a head. Clean ſand and gravel is put into both, ſo that the level of the ſand within the inner caſk (room being left to pour in water) be higher than the bed of ſand in the intermediate ſpace betwixt the two caſks. A cock is fixed in the outer caſk, above the ſand, at a level ſomewhat lower than the ſurface of the materials in the inner caſk. The water poured in at top of the inner caſk, ſinks through the maſs of ſand; and paſſing alſo through that in the outer caſk, aſcends and is diſcharged at the cock, when wanted. As the ſurface of the ſand in the inner caſk becomes loaded with impurities, remove it, and add freſh clean ſand.

According to Mr. *Lowitz*, three half ounces of charcoal powder, and twenty-four

four drops of oil of vitriol ſuffice to purify three and an half pints of corrupted water, without giving it acidity. If the vitriol is omitted, it requires thrice the quantity of charcoal or nine half ounces. The vitriol is firſt mixed with the water: then the coal. Spring water having an unpleaſant hepatic flavour, is improved by *filtering it through a bag half full of charcoal powder*. Dry this charcoal, and powder it over again; it then will anſwer a ſecond time: and if made red hot in a *cloſe* veſſel, the coal will immediately recover its power of purifying, after having before loſt it by uſe. Mr. *Hufeland* ſays, reduce burnt charcoal to a fine powder: mix a ſpoonful of it in a pint of ſtagnant, bad, or putrid water: ſtir it well and let it ſtand a few minutes: then run it ſlowly through filtering paper. The ſame powder will anſwer again. To travellers it is recommended that they dry the powder and keep it corked cloſe up in a vial; and for families in bottles.

To purify water in a way I am about to make experiment of, for procuring freſh water from ſea water, the water is to be filtered through a clean ſea ſand in tubes, near five feet down and as many up, till the water has paſſed through fifty or ſixty feet of ſand, and is ſo far filtered. The caſe is of wood, and takes up the room of about ſix feet ſquare, and only about eight inches thickneſs, the tubes being four by five inches ſquare, in the clear. If it fails of freſhening ſea water, it ſtill will anſwer for filtering ſpring rain or running water to a great perfection. The hint for ſtraining ſea water thus through ſand, I take from the practice of horſes running on ſand iſlands, upon the coaſt of Virginia and Maryland, where they have no other means of procuring water to drink than by ſcraping holes in the beach on falling of the tides; from whence they get good water: and very ſweet water is obtained at old Point Comfort, in the Cheſapeak, from ſinking a caſk or two in the beach.

Rain

Rain water is ſaved in ciſterns under ground in many places of Europe, eſpecially in Holland, Spain, Italy and Sicily; and according to travellers, there is no ſweeter or purer water. It is eſteemed according to its age, which gives it its remarkable purity. I think it is Mr. *Stolberg* who ſays rain water three years old was recommended to him, and he found it very excellent. See before, page 466, of Houſe Ciſterns.

## *H E M P.*

It is ſaid that both the dreſſing and ſpinning of hemp are beſt performed in a damp place. It is inclined to twiſt too much in ſpinning. Alſo that it is a leſs injury to the hemp to pull the plants before they are ripe enough, than to leave them too long ſtanding; and it is a leſs injury, in ſoaking hemp, to leave it too long in the water than to take it out before it is ſufficiently ſoaked (*live* or running water is meant and ſpoken of). And it is aſſerted, that putting the

cluſters

cluſters containing the hemp ſeed, to ſweat and heat, cauſes many ſeeds to ripen.

The above obſervations on hemp are taken from a publication in London, in 1790; in which the reader may be alarmed at the boldneſs of the aſſurance reſpecting hemp being long left in water: but a diſtinction is to be taken between water *ſtagnant*, where it would rot; and water running or *alive*, in which it cannot rot.

## *FIRST IMPRESSIONS.*

*Science* is but little regarded by huſbandmen. Yet an education which tends to promote the ſocial virtues and manners, is invaluable in all ſtations of life. But *the virtues with happy manners*, can only be aſſured to the riſing generation by the very earlieſt attentions to children by the pious good *mother* and *nurſe*; beginning with the firſt liſp: for childern reaſon and underſtand, though not ſtrongly, yet long before they can articulate.

Nevertheleſs,

Nevertheleſs, how neglected and how little underſtood is education, as well in the town as the country. Parents act as if all that is neceſſary is to ſend children to ſchool: but how miſplaced is book learning without firſt impreſſing them at home with good intentions, good principles; and leading them to a deſire of improving as well their *manners* as their *minds*.

Attentions are miſapplied in the education of children which early burthen their memories with catechiſms. Religion, morals and manners are contained in the Goſpel of Jeſus Chriſt; which conſiſts of a few plain principles that are invaluable! but theſe are nearly loſt in a cloud of forced and unnatural expoſition and fantaſy. To impreſs the minds of children with the general belief of their ſubordination to a *Supreme Being*, who is *perfect goodneſs*, without attempting thus early to explain more of the Deity, is it not enough!

" Amongſt

" Amongſt the ancient Romans, *parents* " anxiouſly attended to the education of " their children; beginning it *from their* " *birth.* They committed them to the " care of ſome well known *prudent matron* " of character (or the mother performed it) " whoſe buſineſs it was to form their *firſt* " *habits* of acting and ſpeaking; to *watch* " their growing paſſions, and *direct* them " to the proper objects; to *ſuperintend* " their ſports, and ſuffer nothing *indecent* " or improper to come from them: that " the mind preſerved in its *innocence*, nor " depraved by a taſte of deluſive pleaſure, " might be *free* to purſue things laudable, " and apply its whole ſtrength to the pro- " feſſion in which it is diſpoſed to excel. " No time of improvement was loſt; *and* " *literary inſtruction kept pace with the* " *moral.* They were accuſtomed to hear *at* " *home* the *pureſt language and ſentiment*, " from their *nurſes*, their *fathers*, and their " *mothers*, accompanied with attentions, " gentle manners and addreſs towards all " their fellow creatures."

*RAW*

## *RAW LIMESTONE AND GYPSUM MANURES.*

Mr. Chancellor *Livingston* of New York, has made a number of valuable experiments, which are publiſhed by the agricultural ſociety there, and from which the following are ſelected. In Auguſt 1790, on a rood of ſtiff clay ground lying very flat, he ſpread one buſhel of pulveriſed *limeſtone*. In the next ſummer, the effects of it were diſcernible to an inch, both in the verdure and luxuriancy of the *graſs*. The difference between it and the parts adjoining were in its favour, as he judged on counting the cocks, as ſeven to four: from whence he infers that, on *clay* ground, eight buſhels of pulveriſed limeſtone are at leaſt equal to ſix of gypſum. This is very important teſtimony. Many places are ſcarce of fuel for burning limeſtone: and if ever ſo plenty, huſbandmen can find means for pulveriſing eight buſhels of the ſtone, at a cheaper and more advantageous rate than they can break up and reduce 100 buſhels

buſhels of ſtone, cut the wood, cart in the ſtone and wood, charge the kiln, and attend ſeveral days and nights to feed it: beſides the difference of carrying it out and ſtrewing it on the fields. At the ſame time the Chancellor tried the effects of pulveriſed *limeſtone*, at the rate of ten buſhels to the acre on a ſandy loam; and this acquired the ſame verdue as the part that had been dreſſed with *gypſum*.—On the 20 May 1791, the Chancellor viewed a piece of *flax*, ſown very injudiciouſly by a poor tenant, on *a dry ſandy declivity*. It looked extremely ſickly, and the tenant thought of plowing it up: but the Chancellor preſcribed for it, three buſhels of *gypſum* to be applied the next morning whilſt the dew ſhould be yet on the ground. It was accordingly applied, and the benevolent Chancellor expreſſes his ſatisfaction in having ſeen the tenant gather more *flax* from this *half acre*, in an uncommon dry ſummer, than any *acre* in the neighbourhood afforded. In many caſes of experience, the principle I hold of gypſum ſhewing its extraordinary

extraordinary power in promoting vegetation moſtly in *dry ſeaſons*, is corroborated: for it is principally in dry ſeaſons and ſituations that gypſum ſhews its importance in puſhing vegetation forward; undoubtedly by its ſuperior virtue in inviting or attracting particles of moiſture, to itſelf and plants near it.

Mr. Chancellor Livingſton from his eighteen experiments on gypſum, limeſtone, raw; and oyſterſhells, pulveriſed; draws the following inferences:

1. That *gypſum* in ſmall quantities has no viſible effect, *on wheat or rye.*

2. That it is uniformly beneficial to *Indian corn*; unleſs it be in very rich or very wet ſoils.

3. That it is beneficial to *flax* on dry poor ſandy land.

4. That

4. That it is peculiarly adapted to the growth of *clover in all dry* ſoils, or even in wet ſoils in a *dry* ſeaſon.

5. That *limeſtone* pulveriſed, has ſimilar effects with *gypſum*: but whether it is better adapted to wet ſoils, he could not as yet determine.

6. Another fact, he ſays, ſeems to be very well eſtabliſhed, though he could ſay nothing of it from his own experience, that its effects as a manure are hardly perceivable in the vicinity of the ſea.

## *RUST of WHEAT.*

"Mr. Iſaac Young, of Georgia, mixed rye amongſt his ſeed wheat, and thus eſcaped the blaſt of his wheat. It was repeatedly tried, till he was convinced of its efficacy: and then he ſowed five acres with *wheat*, ſurrounded with a liſt of 25 feet breadth of rye: and this alſo ſucceeded; and

and being repeated, is found a certain ſecurity to the wheat." *Rom. Florida* 118.

I have alſo heard an Engliſh farmer ſay that rye ſown mixt with wheat will prevent the wheat from being blighted, in England.

*A Stuffing for Leather, in Shoes and Boots.*

The New-England fiſhermen find great benefit from ſerving their boots with the following compoſition; which excludes water, and preſerves boots and ſhoes. The ſame advantages are applicable to the ſhoes of huſbandmen. My ſhoes have been ſerved with it conſtantly for ſeven years; and in no inſtance have let in any water or dampneſs through the leather: nor does it harden or ſtiffen the thinneſt calf leather. One pint of boiled *linſeed oil*; half a pound of *mutton ſuet*; ſix ounces clean *bees-wax*; four ounces *roſin*: melt and mix well over a ſlow fire. Shoes or boots when quite new and clean, are a little warmed; and then are ſerved with the ſtuffing alſo warmed,

warmed, but ſo as not to ſcald, as much as the outſide of the leather, upper and ſoal, can receive; and eſpecially the ſeams and joining of the ſoal and upper leather are to be well ſtuffed; taking care the tack-holes are plugged up; and that all is perfectly dry. The leather will want no renewal of the ſtuffing: at leaſt my ſhoes never have. I uſe a painter's bruſh for laying on the ſtuff. This ſtuffing fills the pores of the leather and excludes water, as the ſap of green wood when inſpiſſated by fire fills the pores of wood and excludes water.

## *BRAMBLE FENCES.*

The intelligent Doctor *Anderſon*, of Scotland, gives an intereſting account of the *bramble;* and recommends it as far preferable to the ſweet briar in a fence.

Its character is, that it reſembles the raſpberry in the manner of its growth; and they differ from all other plants. But the

the bramble has a peculiarity, differing from the raſpberry in this: it alone poſſeſſes the faculty to ſtrike out roots *at the point* of each ſhoot of a year's growth; and no other part of the ſtem can be brought to ſtrike root, even if laid in the ground So that to prevent brambles from rambling and fouling the ground, nothing more is neceſſary than to walk round the bramble fence, and whip off the ends which dangle towards the ground. He recommends every *Auguſt* for this work. It will want no other clipping, ſhortening, or dreſſing.

Like the raſpberry, the bramble yearly ſends out many ſhoots from the bottom (the ground), which puſh out to the whole length they ever attain, during the firſt year. Theſe ſhoots, in this ſeaſon, conſiſt of *ſingle ſtems* which never branch, unleſs where by accident they have been cut over, when they become forked. In the next ſeaſon theſe *ſtems* ſet out many fruit-bearing branches, along their whole length,

which

which flower and perfect their ſeeds, while a new ſet of *ſtems* are puſhing from the bottom to become ſeed-bearers next ſeaſon. After perfecting their ſeeds the *whole ſtem* that bore them, with all its branches, *dies*. This is the unvarying progreſſion obſerved in the growth of the bramble plant: ſo that a hedge of it, will at all times contain *three diſtinct kinds of ſhoots*, intermixed with and croſſing each other in all directions: 1. the *dead ſhoots*; 2. the *fruit ſhoots*; 3. the *roots puſhing forward* in their *lengthy growth*. They are all covered with ſtrong ſpines, and form an impenetrable matting, when confined within proper bounds.

A good fence of *bank and bramble* may be reared in moſt ſituations, ſays Mr. Anderſon, at 2*d* to 3*d* ſterling a yard (3 to 5 cents;) for a facing is required only on one ſide.

*Sweet briar* he obſerves is not equal to the bramble: for unleſs it be often cut over by the roots, it gets naked below, rugged, and

and unſightly, if without ſupport from other plants; and *if other plants be near them*, they grow poorly. In expoſed ſituations too the wind gets hold of the tops and by acting on them as a lever, is apt to pull down the bank.

The *bramble* is liable to none of theſe objections; and it ſeems to be, he adds, the very plant fitted by nature for forming that cloſe, netted prickly coping, alike wanted to prevent animals from tearing down the bank, and to preſerve it from the levelling power of the wind, and other external injuries. The bramble eſpecially excels other plants on upland thin ground.

*Bramble fences*, which are equally applicable in ſoft good ſoils and thoſe that are harder in rocky and hilly countries, may be thus conſtructed:

A *bank* is raiſed on the inner ſide of a *ditch*, where it can be dug and faced with ſtones, of a good binding quality; or if the

which flower and perfect their ſeeds, while a new ſet of *ſtems* are puſhing from the bottom to become ſeed-bearers next ſeaſon. After perfecting their ſeeds the *whole ſtem* that bore them, with all its branches, *dies*. This is the unvarying progreſſion obſerved in the growth of the bramble plant: ſo that a hedge of it, will at all times contain *three diſtinct kinds of ſhoots*, intermixed with and croſſing each other in all directions: 1. the *dead ſhoots*; 2. the *fruit ſhoots*; 3. the *roots puſhing forward* in their *lengthy growth*. They are all covered with ſtrong ſpines, and form an impenetrable matting, when confined within proper bounds.

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A *bank* is raiſed on the inner ſide of a *ditch*, where it can be dug and faced with ſtones, of a good binding quality; or if the

ſtones are ſmall or roundiſh, or fewer than wanted, they may be laid in alternate rows with *ſods*. Where no ſtones are to be had, the facing may be entirely of ſod. The backing to be made of earth, dug either from the ditch, if on a level, or ſcraped from without, if upon a ſlope; or taken from behind where it is eaſieſt had; ſo as to raiſe the *wall* with its *ditch* four to five feet high. Upon the *top* of this *bank* and about *one foot backwards from its edge*, plant a row of *bramble plants*, at about ſix inches apart all around. If taken from the commons be ſure they are all *young plants* nearly grown and well rooted: for it is of the utmoſt conſequence that the hedge ſhould *come forward equally* in all its parts; ſo as not to leave a ſingle gap in any place. To inſure this, plants reared from ſeeds are beſt and the cheapeſt. The plants are to be examined the *firſt ſeaſon after planting*; and ſupplied with what are wanting: without which attention, the hedge can never afterwards be made *equal* and *uniform* throughout. I am induced, ſays Mr. Anderſon,

derſon, to take notice of the circumſtance *thus pointedly* from obſerving a culpable careleſsneſs reſpecting it, which is the chief cauſe of the *raggedneſs* in hedges that every where prevails. If a dead fence of thorns and bruſhwood be placed on the top of the fence at the time when the *brambles* are planted, theſe live plants may be intermixed with the dead fence, to advantage rather than detriment. Care is to be taken of ſheep, that they have not acceſs to injure the *bank*.

If the hedge has been planted with care, it will come forward with great luxuriance, in ſhoots which riſing upwards and ſpreading out on both ſides form a *cloſe matted coping of ſpring plants* all over, which will effectually prevent intruſion of men or animals.

The people of Kent County, Maryland, who made naked bank fences, mentioned in page 236, wanted only to know the above uſes of bramble plants for them to have completed their deſign. They made

banks, and ſodded them very perfectly. Brambles upon theſe banks would have properly ſhaded the banks and preſerved the graſs, and with dead wood for the firſt ſeaſon or two, among the brambles would have kept off beaſts from cutting down the ſods, and always afterwards.

## *IMPROVEMENT OF THE MIND FOR RURAL LIFE.*

" Of ſcientifical purſuits, the moſt liberal, the moſt honorable, the happieſt, and what probably will be the moſt ſucceſsful employment for a man in eaſy circumſtances, (particularly in country life,) is the *ſtudy of nature*, including natural hiſtory and natural philoſophy; and therefore to this important object a principal attention ſhould be given in educating youth who have the means of applying to theſe inſtructive and comfortable purſuits, when it may be without interfering with the means neceſſary to his ſupport. Every man finds vacant moments from his ordinary buſineſs, which cannot

cannot be better filled than by ſuch attentions as lead to the improvement of his underſtanding and elevate his mind to admire, more and more, the aſtoniſhing works of the Creator; and thus is real religion befriended.

" All the *arts*, from whence is derived all that tends to the ſecurity and comfort of mankind, depend upon the knowledge of the *powers of nature* wherewith we become converſant; and the only poſſible way of aſſuring and increaſing the conveniencies and comforts of life, of guarding againſt inconveniencies and vexations, to which all are ſubject, and of enlarging the powers of man, is through a further *acquaintance with the powers of nature!*" —From Doctor *Prieſtly*, a very little altered. Some inſtruction in geometry and mechanics would alſo be advantageous in country life.

Farmers who do not lay the hand to the plow, often want they know not what: time hangs heavy on them: They feel diſſatisfied, reſtleſs: a void ſurrounds them.

them. Employment of any ſort would give them relief. But they mount the horſe, and leave their *family* and the inviting calls of an improvable landed eſtate or farm, to ſeek amuſement in riding to and fro; ſometimes unwarily popping into taverns. But, though time is thus paſſed away, they gain no ſolid or permanent ſatisfaction, much leſs any improvement of the mind: and to be ſure the farm is not improved; nor its work well done. Were theſe maſters of farms fortunately led by their parents to taſte the ſweets of ſuch an education as Dr. *Prieſtly* recommends, the *ſtudy of nature*, they would never want ſoothing and nouriſhing food to the mind; and from their being employed in inquiries concerning the wonderful works of the *Supreme Being*, a ſound and rational piety would be increaſed and confirmed in them. The book of nature far ſurpaſſes books of clumſy art; whilſt the wordy works of miſled and miſleading inſtructors convey no profitable knowledge, and are inſignificant to common ſenſe, and to good minds wiſhing to

be

be impreſſed with the knowledge of plain truths, and improved in whatever is amiable and promotive of good. The comforts held out by the goſpel of *Chriſt*, confirm the hope derived from contemplations on *nature:* and there is a perfect agreement between the pure principles of the *goſpel*, and the laws of *nature*.

## *ORCHARDS.*

It ſeems, in England as in America, orchards have been conſiderably neglected; and the knowledge of proper modes of managing them was not generally well known in the moment when a well-timed and generous interference, of a Mr. *Bucknall*, effected ſuch a current in favour of them, as that they are again becoming a great conſideration in England. Beſides Mr. Bucknall's perſonal attention to his own, his neighbours, and friends orchards, and very actively diffuſing a knowledge of the new principles in converſations, he addreſſed the London ſociety for the encouragement

ragement of arts, laid before them his principles of *orcharding*, as he calls it, obtained firſt their ſilver medal, and on a further communication their gold medal with their thanks. The certificates accompanying his communications are very ſtrong in their favour; and his practice is warmly adopted, and in a courſe of being generally purſued by the Engliſh farmers. An experienced and intelligent farmer, from New-England, alſo aſſures me that for the correctneſs of Mr. Bucknall's principle on cloſe-pruning, he can vouch, from his own practice twenty-five years ago. A pamphlet on Mr. Bucknall's principles and practice is publiſhed in London, entitled *The Orchardiſt*; from which the following notes are taken.

The management of orchards is capable of being reduced to a ſyſtem, under a few general heads concentrated in the principle of making every tree in orchards, *healthy round*, *large*, and *beautiful*.

Due

Due pruning would greatly prevent the *ſpeckled and ſtunted fruits* occaſioned by the trees being *overloaded with wood;* which obſtructs the rays of the ſun, and cauſes a *vapour*, the cold whereof *ſtunts the fruit* in its firſt growth.

The bark of trees conſiſts of the *outer*, rough; the *middle*, ſoft and ſpongy; the *inner*, a whitiſh rind which joins the bark to the wood, and is ſuppoſed to contain the liquid ſap.

When the ſtem grows too faſt for the bark, it cauſes blotches and lacerations; which is avoided by ſcoring the bark with a ſharp knife, ſo as not to cut through the whitiſh rind.

## *CLOSE-PRUNING, AND MEDICATING FRUIT-TREES.*

Pruning with judgment brings trees to bear ſooner; and continue in vigour nearly double their common age. Mr. Bucknall gives no attention to *fruit branches* and *wood*

*wood branches* in the preſent inſtance.* No branch is ever to be *ſhortened*; unleſs for the figure of the tree, and then *cloſe* at the ſeparation.

The more the range of the branches ſhoot circularly, a little inclining upward, the more equally the ſap will be diſtributed, and the better will the tree bear.

Let not the ranges of branches be too *near each other*; as all the fruit and leaves ſhould have their full ſhare of the *ſun*. Where it ſuits, let the *middle* of the tree be free from wood; ſo that no branch croſſes another, but all the extreme *ends point outwards*.

A neighbour ſaying, your trees are *handſome* but too *thin of wood*, is a high compliment;

* The expreſſion "*In the preſent inſtance*" muſt mean, in general, reſpecting his preſent ſubject of pruning: gives no attention to fruit branches and wood branches, in pruning fruit trees ſuffered to run greatly into wood: but thins them to be *airy*, and to give *ſhape* and *regular branches*.

compliment; for they will gain the beſt price for the fruit at market, a ſure teſt of perfection.

A young orchard was planted in a rich ſoil and it throve greatly. Such vigorous growth occaſioned an early decay of the trees, from the wind ſplitting them down; and the wood being ſoft many cauſes concurred to injure them. The injudicious manner in which the lacerations were taken off added to the evil; for generally a gum follows from a wound; and this becomes filled with vermin, which obſtruct the healing by their eating and fretting the bark. Mr. Bucknall is here ſpeaking of an orchard of both *apple* and *cherry* trees; the latter yield gum.

He found the branches ſo intermixed and entangled together as to cut each other and cauſe wounds and blotches; which on the return of the ſap in the ſpring, affects the leaves by inclining them to curl.

In

In this ſtate of the orchard, in the November following, Mr. Bucknall undertook to improve it; and found that the branches could not be cut true enough with *a bill*, to take them off, without leaving a ſtump or improper wound, as it is eſſential that every branch ſhould be cut perfectly *cloſe and ſmooth*. He therefore uſed *ſaws*, and afterwards *ſmoothed with a knife*. Immediately on this the wounds, with *medicated tar* on a bruſh, were ſmeared over.

As the bark can never grow over a ſtump, he always cuts a little *within* the wood. The rule is to cut *quick*, *cloſe*, and *ſmooth*.

Mr. Bucknall and his aſſiſtants kept together, and firſt walked round the tree. He then pointed out every branch that came near the ground or had received material injury, or where the leaves were much curled (which are accompanied with ſpecky fruit;) and every branch having the leaſt tendency to croſs the tree or run inwards, was taken off. Then he attend-

ed

ed to the beauty of the *head*, leaving all the branches as nearly equidiſtant as poſſible. Next they examined if there were any remaining *blotches*; and opened and ſcored them with the knife; and where the bark was *ragged* from laceration, pared it gently down till they came to the live wood. Each of theſe were then touched over with the medicated tar. The moſs ſhould then be rubbed off and the trees ſcored.

In cutting they went to the quick, but avoided making the wound larger than neceſſary.

In doubting whether a particular branch ſhould be taken off, they conſidered if it will be in the way three years hence. If it will, the ſooner it is off the better.

When trees are much trimmed they throw out many ſhoots in the ſpring. It is neceſſary that theſe be *rubbed* off, not cut; for cutting increaſes them.

The

The *MEDICATED TAR* is compoſed of one half ounce of *corroſive ſublimate*, reduced to a fine powder by beating it with a *wooden* hammer: then put it into a three-pint *earthen* pipkin, with a glaſs full of gin or other ſpirit ſtirred well together, and the ſublimate thus diſſolved. The pipkin is then filled by degrees with common tar, and conſtantly ſtirred, till the mixture is blended, intimately as poſſible. This quantity is ſufficient for 200 trees.

Corroſive ſublimate is a violent poiſon; and to prevent miſchief, it is to be inſtantly mixed in the tar, ſoon as bought. Mr. Bucknal finds the ſublimate diſſolves better when united with the ſame quantity of ſpirit of hartſhorn or of ſal ammoniac.

Farmers fearing to meddle with corroſive ſublimate may get their apothecary to mix the ingredients; the tar being ſent to him. Or let them try the following as an experiment. Mix fiſh oil one part with tar two or three parts, by ſtirring them well over

over a gentle fire, that the mixture may be perfect. Apply it when cold. Would you add things bitter or acrid; as aloes, or red pepper?

For giving more body or conſiſtence to this mixture, add fine powder of fullers earth or clay; or according to Lord *Newark*, powdered chalk.

Do not attempt to force a tree to grow higher than it is diſpoſed to grow: but keep the branches out of the reach of cattle: then let them follow their natural growth.

In general prune trees *ſoon as the fruit is off;* that the wounds may tend towards healing before the froſt comes on.

The ſubſtantial *form of the tree is the ſame before and after pruning.* It is of the ſame ſize, and the extreme ſhoots are all kept at the ſame diſtance. But too often the

the heads of trees are mutilated and the tree is left in a more decaying ſtate.

The year before the trees are to be planted out, chooſe and *prune them in the nurſery;* taking off perfectly *cloſe*, all rambling and unſightly branches, leaving the *heads* to three or four good leading ſhoots. From pruning thus in the *nurſery* the *year preceding the planting* out the trees, it will not be requiſite to prune for ſome time; and the wounds being healed, will accelerate their growth. Plant none galled, fretted or cankered. Take them up to be planted, with roots long as is convenient. prepare ſtakes *before* the day of planting, and ſtake them immediately.

Shelter, by trees, is requiſite on the cold blowing ſides of the orchard, north-weſt to north-eaſt.

Plant not the trees too *deep;* many ills ariſe from it.

Mr.

Mr. Bucknall's tools are; two pruning knives; a ſaw; two chiſels; a mallet; a ſpoke ſhave, and a painter's bruſh. With the chiſels and ſpoke ſhave work upwards, or the bark will ſhiver. The ſaw muſt be coarſe ſet; all the other tools ſharp and ſmooth.

He prefers the blade-bone of a doe, for rubbing off rotten bark, moſs, &c.

When the trees are planted, a queſtion ariſes what uſe is to be made of the ground? To plow it is dangerous; as the injuries received by young trees from implements in huſbandry are great; and if any kind of corn is grown, the land is impoveriſhed, and then the trees are ſtunted and run to moſs. Hops do well for ſome years, and then let the ground be grazed: and the ground is never to be plowed deep directly *over the roots* of a young planted fruit tree.

Manure is neceſſary to an orchard; and hog's dung is the beſt. Watering orchards in dry weather is important—which may be accompliſhed if a ſtream can be led through it.

Prevent young trees bearing much fruit: pluck it off ſoon as ſeen, except half a dozen to ſhow the quality. *Graze and manure.* Hogs are beſt to run in orchards.

Although no leading branches are to be *ſhortened*, yet whilſt *in the nurſery*, the heads muſt be cut down to give ſtrength and ſymmetry to the ſtem; and alſo moſt of the grafts muſt be ſhortened, or the wind will blow them out; and whilſt in the infant ſtate, ſhortening the plant helps to ſwell out the buds. Shortening is only forbid when the plant becomes a tree.

Moſs is the reſult of *poverty* and *neglect*, and reflects diſcredit on the owner. In a whet day, a ſtrong man with a birch-broom can do great good on moſs. He is

to

to rub all the branches, ſpring and autumn, with a hand-bruſh and ſoap-ſuds. They may then be oiled or not, as you like.

The beſt orchard ſoil is a deep loam. No one for profit would plant on a ſtrong clay or a cold ſharp gravel. But where it is neceſſary to plant on theſe ſoils, never dig into the under-ſtrata; which would be planting in well-holes: rather plant the trees above ground, raiſing over them a little mound of good mould, and ſow on it white clover.

In pruning, never omit the *medication*; as the mercury is found ſtrongly operative in removing the effects of canker, giving a ſmoothneſs of the bark, and a freeneſs of growth.

The ſyſtem of *cloſe-pruning and medication* here follows, that it may be ſeen at once:——Take off every *ſtump*, the decayed or *blighted branches*, with all that *croſs* the tree, or where the leaves

curl, *close*, *smooth*, and *even*. Pare the gum down close to the bark, and even a little within, but not to destroy the rough coat: open the fissures from whence the gum oozes, to the bottom: cut away the blotches and pare down the canker: then anoint all the wounds with the medication, smearing a little over the canker not large enough to be cut: wash and score the tree, rubbing off the mos; but do not shorten a single branch.

A tree under such care must, with its remaining free shoots, run large; which requiring a great flow of sap will keep the roots in constant employ, and from that very source necessarily establish permanent health.

Canker, he says, arises much from animalculæ; and if the only object is to remove the *canker*, he finds hog's-lard preferable to tar; but where *wet* is to be guarded against, tar is superlatively better. Ergo: tar and oil, as above.

Mr.

Mr. *Morſhead* practiſed *cloſe-pruning and medication*, according to Mr. Bucknall, on a *great variety of fruit trees of all ages*; which ſucceeded beyond his expectations.

*Twamley's* principles on pruning orchards accord with Mr. Bucknall's, as far as he touches on it.

## *PEACH TREES.*

A farmer in New-Jerſey has publiſhed in the news-papers, an account of peach trees; in which he ſays, on the ſecond of *June* 1795 his peach trees were in a very ſickly ſtate: that he applied the remedy below mentioned; in conſequence whereof by the middle of *July* they had recovered their full verdure and health; and that in 1799 they ſtill continued in full health.

His remedy was in laying bare the ſtems of the trees and the roots near to the ſtems, by taking the earth away. There then appeared in the trees a number of holes the ſize of

of gimblet holes. On probing them hairy worms were brought out, of a whitiſh colour, except that the head was brown with a ſharp noſe; and it was an inch long and had a boring motion. Burdock leaves were dipped in whale oil (currier's fiſh oil) and wrapped about the part of the trees affected; and then the earth taken off was thrown on them. Six quarts of oil ſerved twenty trees. Three of his trees had bees, in hives, under them. Fearing to diſturb the bees with the ſmell of the oil, the ſtems and roots were only laid bare as above; and theſe trees alſo recovered.

He thinks the effluvium of the oil ſoon killed the worms in the firſt inſtance; and that from their being very porous, the air entering the pores killed them in the laſt inſtance: and he adds as his opinion that if the trees are laid bare as above in the ſpring and covered before winter ſets in, it may anſwer the deſired effect, with taking off the fungus or gum on the body of the tree under which the worms breed. A number

ber of them were taken from within a lump of gum, and they all "diſſolved" in the *air*. The old worm on having a drop of *oil* put on its head, drew up in a ball and inſtantly died.

He ſays, a large peach orchard, in Jerſey, was on a looſe ſand, called the ſand hills; which he thinks was "an old orchard in 1738," when he knew it, and he thinks it was in being in 1776 when he rode over thoſe hills, ſo that it continued more than 40 years. He thereon infers that ſandy ſoil is beſt for peach trees.

I have known peach trees give fruit many years in the *ſandy* lands of Severn River, in the country about Annapolis; and alſo on *clay loams* in the peninſula of Cheſapeak; where they were in old fields, or free from ſpade or plow breaking the ground near them. An apricot tree ſtood a number of years in a garden where the ground was yearly dug about it; the fruit always dropt off before it could ripen.

That

That part of the garden being turned out, the ground ſettled and remained cloſe all about the tree: from which time it matured its fruit.

The winter 1783-4 was extremely ſevere. Its froſt killed many noble oaks and other trees, but not one of many peach trees in my orchard and garden. The garden peach trees annually ſuffered by the worm above deſcribed, but never thoſe in the orchard where the ground remained unſtirred. In the ſpring 1784 many ſeedling peach trees being hove up by the froſt, ſeemed to ſtand on their main roots which were left above ground without being injured. Theſe proofs of the hardineſs of peach trees induced me to dig the earth from the garden peach trees late in November, and return it in April. In ſeveral years of this being practiſed, I recollect no inſtance of the worm in thoſe trees.

## *DIET FOR PRISONERS:*

——Iſſued to the priſoners in the gaol of Philadelphia in 1798; for 230 men and women.

### *BREAKFAST AND SUPPER:*

| | C. M. |
|---|---|
| Indian-meal 29½ gals. 5lb. a gal. 147lb. at 2 *c.* 1 4/10 *m.* a lb. . . . . | 314 6 |
| Melaſſes 4½ gals. at 60 *c.* . . . . . | 270 0 |
| Salt 3 *qts.* . . . . . | 6 6 |
| Water 96 gals. in *Muſh* 384 *qts.* of which, | |
| | 591 2 |

| | *c. m.* | C. M. |
|---|---|---|
| For breakfaſt, at 1 3 (more exact 1.285) each perſon, . | | 295 5 |
| For ſupper, do. | | 295 5 |
| | | 591 |

### *DINNER:*

| | C. M. | |
|---|---|---|
| Beef 50lb. at 6 6 . . . . . | 330 0 | |
| Shins 4 . . . . . | 53 3 | |
| Potatoes 1½ buſh. . . . . | 75 0 | |
| Meal, for thickning, 12 *qts.* . . | 43 3 | |
| Onions, herbs, pepper, ſalt . . . | 20 0 | |
| Water 56 gals.—*Soup* 224 *qts.* | | 521 6 |
| | | 1112 8 |

*c. m.*

Dinner, 224 *qts.* ſoup, coſt 521 6 or each 2 2 (more exactly 2 *c.* 26/100)

| | |
|---|---|
| Breakfaſt, each perſon, . . . | 1 3 |
| Supper, do. . . . . | 1 3 |
| Three meals | 4 8 a day. |

The ſums of the account kept are in *£. S. D.* here reduced to Cents and Mills; 10 Mills a Cent; 100 Cents a Dollar.

*THRASHING*

## *THRASHING MILLS.*

In 1782 Colonel *Anderſon* then of Philadelphia, now reſiding on the Suſquehanna, near Lancaſter, invented a mill moved by horſes, for thraſhing wheat and other ſmall grain out from its ſtraw: and took the hint from ſeeing a cotton machine at work. In 1791 he built one of full ſize; which I ſaw work to advantage, though as Colonel Anderſon well obſerved, it was capable of conſiderable improvement. But having ſince invented a thraſhing mill, on different principles, a model of which I ſaw work admirably well, he probably has not further attended to the firſt; and I wait to hear of his ordinary buſineſs admitting him to build one of full ſize, on his new invention of *rubbing*, inſtead of *ſtriking* out the grain. If this kind of mill ſhall be equal to the former when both are worked with horſes, it will have the further advantage of admitting to be reduced in ſize and then worked by one or two men at a winch or two ſuitable to ſmall farms: ſo that

that farms of all ſizes might introduce it, in place of flail and treading.

About the time that Colonel Anderſon invented his mill, a thraſhing mill, on the very ſame principles, was invented in Scotland.

Colonel Dundas, in the 15 Annal gives an account of a thraſhing mill built for him by Mr. Raſtrick in Scotland. It had then been worked for the greateſt part of two crops; and the Colonel ſays the mill is in a barn; an octagon ſhed built on the outſide was only neceſſary to be added for covering the wheel and horſe-path.

| | | | |
|---|---|---|---|
| The mill coſt, ſterling 45£. | | | |
| equal to *Dollars* | | | 200 |
| A cover of boards, with wire platform under the beaters | £3. | 3. | 67 |
| The ſhed, to cover the wheel and horſes | 12. | 0. | |
| | | | 267 |

The

The wire platform begins under the canvaſs, or ſloping board, and extends as far as any grain falls, and has openings to allow the grain to paſs. A woman and boy with a rake can clear the machine of ſtraw, whilſt the grain falls through the wire in a ſtate for being fanned.

It thraſhes 180 buſhels of wheat in ten hours, very clean. Barley is thraſhed with flails, after it comes from the mill for breaking off the awns or beards.

One horſe will work the machine: rather hard work. He uſes two horſes. If a diligent perſon drives the horſes, all perſons about the mill muſt be buſy.

The hands neceſſary are the driver, a boy; the feeder, a careful attentive perſon; a perſon to rake, and two to bundle the ſtraw. He conſiders it work for three men and two boys.

Mr.

Mr. Mowbray, of Durham, ſays his thraſhing mill, built by Mr. Raſtrick, has given him great ſatisfaction. He uſes two horſes, a boy, a man, and two women. It had thraſhed out 12800 buſhels of wheat; 6400 buſhels of oats, and 6400 buſhels of barley: in all 15600 buſhels of grain; and had coſt him nothing in repairs; and there is no difficulty in working it.

Mr. Wilkie ſays his thraſhing mill is ſo ſimple that repairs can be ſeldom wanting. It is a moſt valuable machine.

Mr. Boys's mill is in a barn, and a projecting building contains the great wheel; which is 12 feet diameter, has 120 cogs working into 12: the cogs at the end of the ſhaft are 87, which work into 14. The under, of the two cylinders, for drawing the corn through, is of wood, the upper of caſt iron: a wheel of 15 cogs works into 33 for turning them. The beating or flail wheel (barrel), is 5 feet long, and

$3\frac{1}{2}$ feet diameter to outside beaters: has 4 beaters, battens or flails fixed to it, and strikes, *upwards* 1000 strokes a minute. Others strike *downwards*, which do not clear away the straw equally well. The straw is carried *over* the beating wheel, and falls on a latticed floor, for the short stuff to fall through. Four horses work the mill. A boy drives: a man throws up the sheaves: a boy supplies: one man to spread them on the inclined plane; and two men to fork away the straw. The whole 4 men, 2 boys, 4 horses. It thrashed 360 bushels of oats in 10 hours. For clearing away the straw, as it comes from the mill, a wheel turns in a direction contrary to the beating wheel, and clears it completely. 15 An. 481. 20 An. 248. 504.—Mr. Meikle built a mill for Mr. Adams, worked with four horses, which thrashes out 640 bushels oats in 10 hours. Length of the barrel $4\frac{1}{2}$ feet, diameter $3\frac{1}{2}$ feet, *treble* motion. Wheels, cast iron. There are many mills for thrashing, of different

different conſtruction, in England and Scotland.

" *The Spirit of Commerce renders men*
" *avaricious:——and a People demoralized*
" *ought to be brought back to* AGRICULTURE:
" *for, Commerce feeds the Paſſions; Agri-*
" *culture calms them.*"

FINIS.

*Plate. II.*

*Fig 1.*

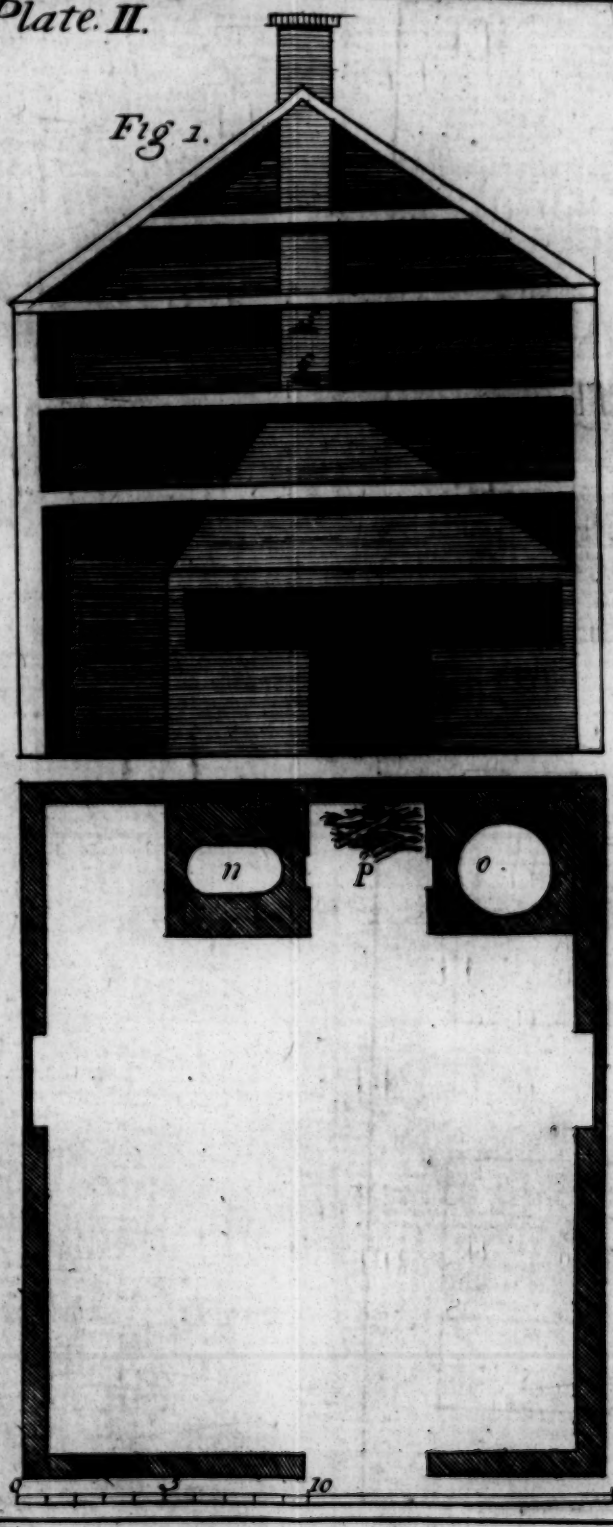


Fig 5.

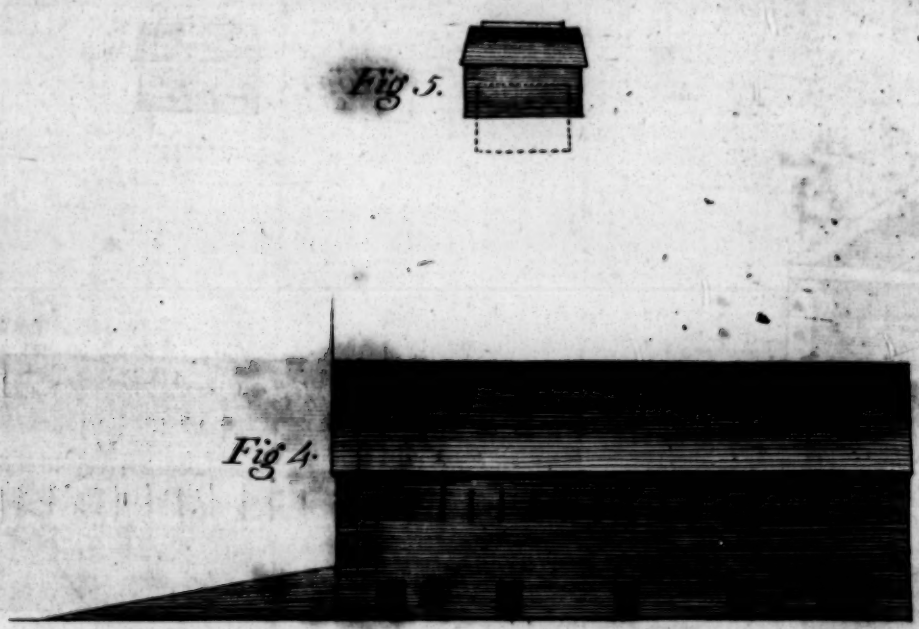


Fig 4.

Fig 3.

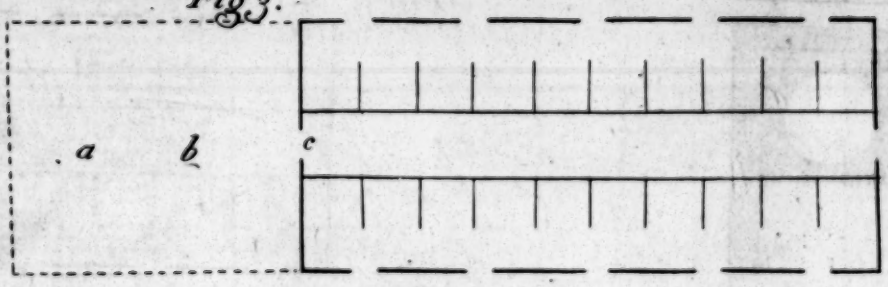
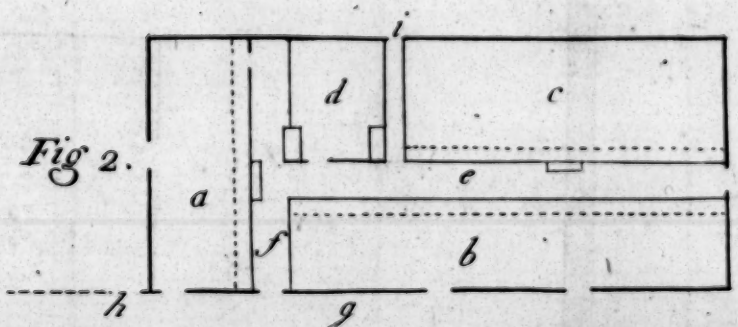
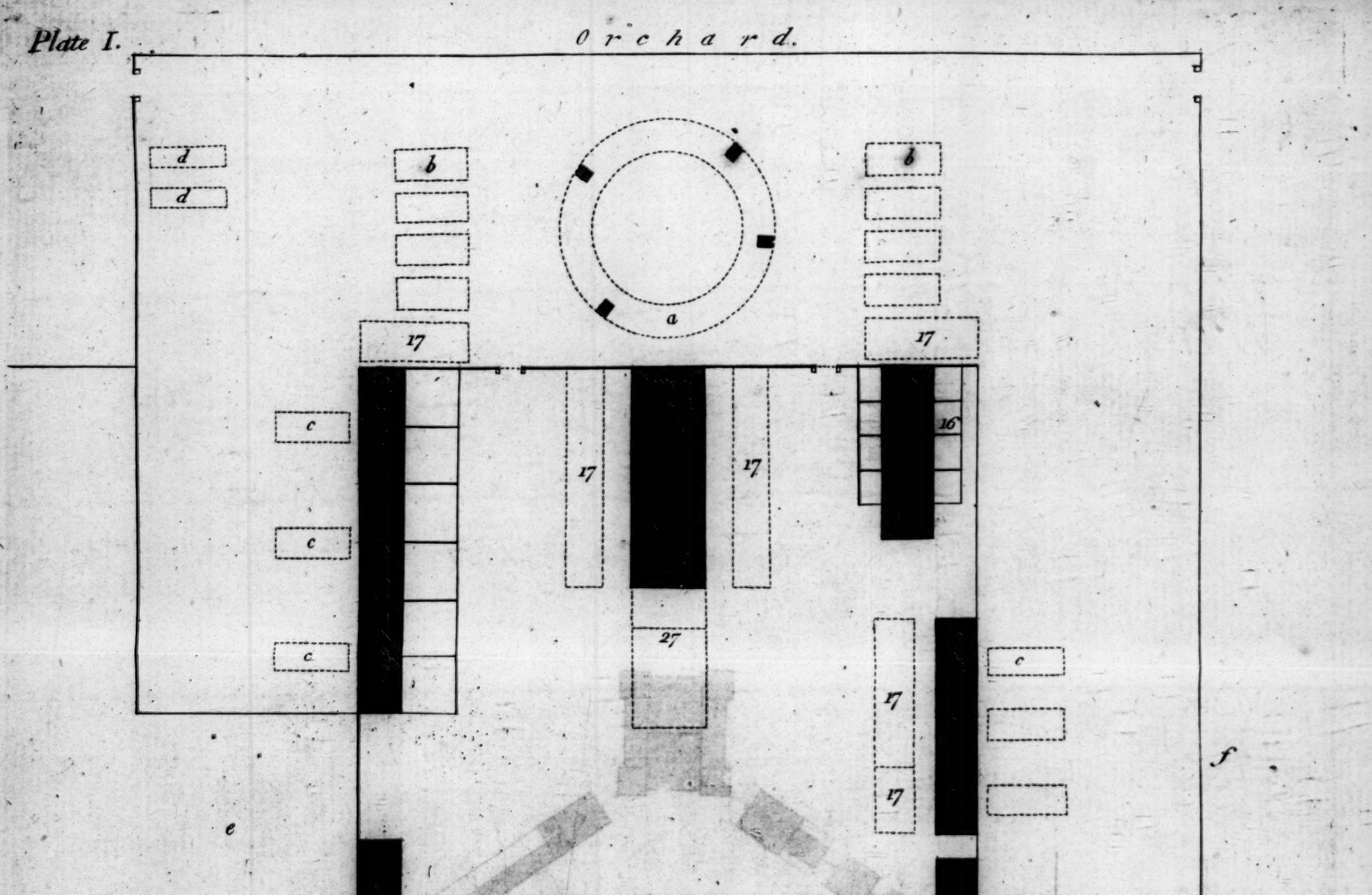



Fig 2.




20. f.

*Plate I.*



100 ft
50
0
30
31
43
8
9
12
11
10
12
4
3
29
9
20

# Explanation of the Cuts.

## PLATE I.

A Farm-yard, homeſtead and buildings; explained in the work.

## PLATE II.

Fig. I. A family laboratory; explained in the work. *n* The tripartite brewing kettle. *o* A boiler. *p* Fire-place: from whence ſmoke to the meat above. *q* Beams ſuſpending meat, in ſmoking it. 5 A regiſter, open when the ſmoke is to paſs through the chimney; ſhut when to be thrown into the room, amongſt the meat. 6 An aperture through which ſmoke paſſes among the meat, when 5 is ſhut cloſe; and ſhut when the ſmoke is to paſs through the chimney at the top. In this houſe, meat may be cut up, ſalted and ſmoked: lard and tallow tried: candles and ſoap, made: waſhing, ironing, ſpinning, carding, dying,

brewing, purifying ſalt, ſcalding milk utenſils with water paſſing through the wall from the boiler, &c. be performed. *Green hiccory* gives the ſweeteſt and beſt ſmoke: ſuperior to dry hiccory or locuſt, aſh, oak; and to corn ſtalks; all having been tried by me in drying malt.

Fig. II. Ground-floor of a Pennſylvania barn, as deſigned by a Cheſter county farmer. *a.* Horſe ſtable, having one ſmall and two larger doors. It is 14 by 35 feet.—— *b* Store cattle, in ſtalls: ſize 60 by 13 feet, with two doors.—— *c* Beef-cattle. This ſide of the houſe, if at a bank cut down, has only one end-door. The ſize of the ſhelter 44 by 17 feet.—— *d* Chaff room; having a cheſt for horſe-feed; another with cattle meal.—— *e* A long paſſage to feed from, 60 by 5 feet, has a box to chop potatoes in.—— *f* Short paſſage 35 by $5\frac{1}{2}$ feet, with a trough for mixing food; and a ſmall door at the furthermoſt end.—— *g* Dung and litter yard.—— *h* A gate.—— *i* Door into potato vault; under the bridge which

which paſſes up to the thraſhing and grain floor. This ſide of the houſe when againſt a cutdown bank, has one only door for the beeves to paſs, at one end of the houſe; and the width of their apartment is therefore wider than for the ſtore cattle.

Fig. III. Ground floor of a proposed barn, ſize of fig. II. The ſtalls 6 feet wide; each holding two grown cattle. It has five ſide doors, 4 feet wide, on each front; which gives one door to 4 cattle or 2 ſtalls. The paſſage is here wider than needs be, being 9 feet. The ſtalls are 13 feet deep. In a roomy paſſage roots are cut, meal ſtored, &c. beſides having the racks, and feeding from thence.—— *a b* Area of the bridge, if there is no bank; and it is beſt to give it great breadth, for admitting of a large vault, and aſſuring ſafety to the teams. This vault is 15 by 35 feet.—— *c* Door into the vault. Roots are let down, into it, through a funnel at the top of the bridge.

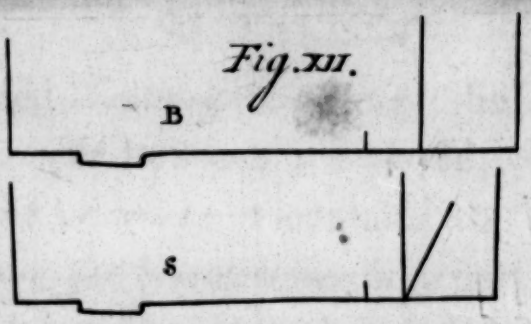
Fig. IV.

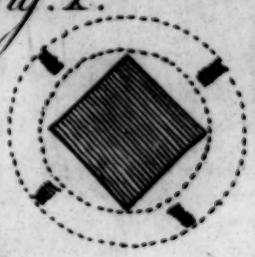
Fig. IV. Elevation over fig. 3.

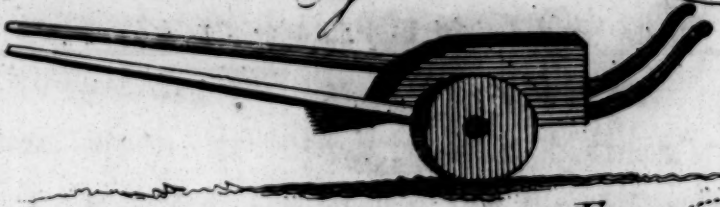
Fig. V. An ice-houſe. The pit, of logs, 13 feet ſquare clear. Under ground 4 feet, above ground 4 feet; containing a maſs of 1352 ſolid feet of ice. The ſides of the pen of logs are to be lined with clean, ſound ſtraw, and the top of the ice thickly covered. A ſmall door is juſt above the pen of logs or maſs of ice. The houſe covering the whole may be 13 feet ſquare. But if the pen is to be inſulated with ſtraw between it and the bank, the houſe is to be 16 or 17 feet ſquare. Yet, where the ice is ſo little under ground as 4 feet, it may not be neceſſary. If however the pit is 8 or 10 feet deep, my experience ſtrongly recommends that the pen be inſulated with ſtraw, between it and the bank.

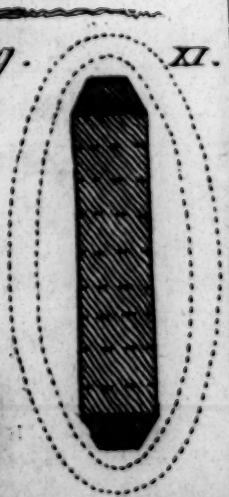
## PLATE III.

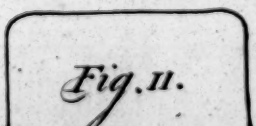
Fig. I. II. Brewing veſſel, 40 inches long: 20 broad: 24 deep.—— *a* Diviſion 13 inches deep: *b* 9 inches: *c* 2 inches. The dotted











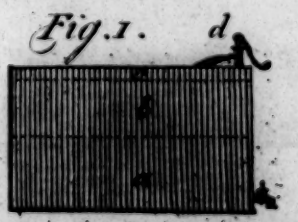
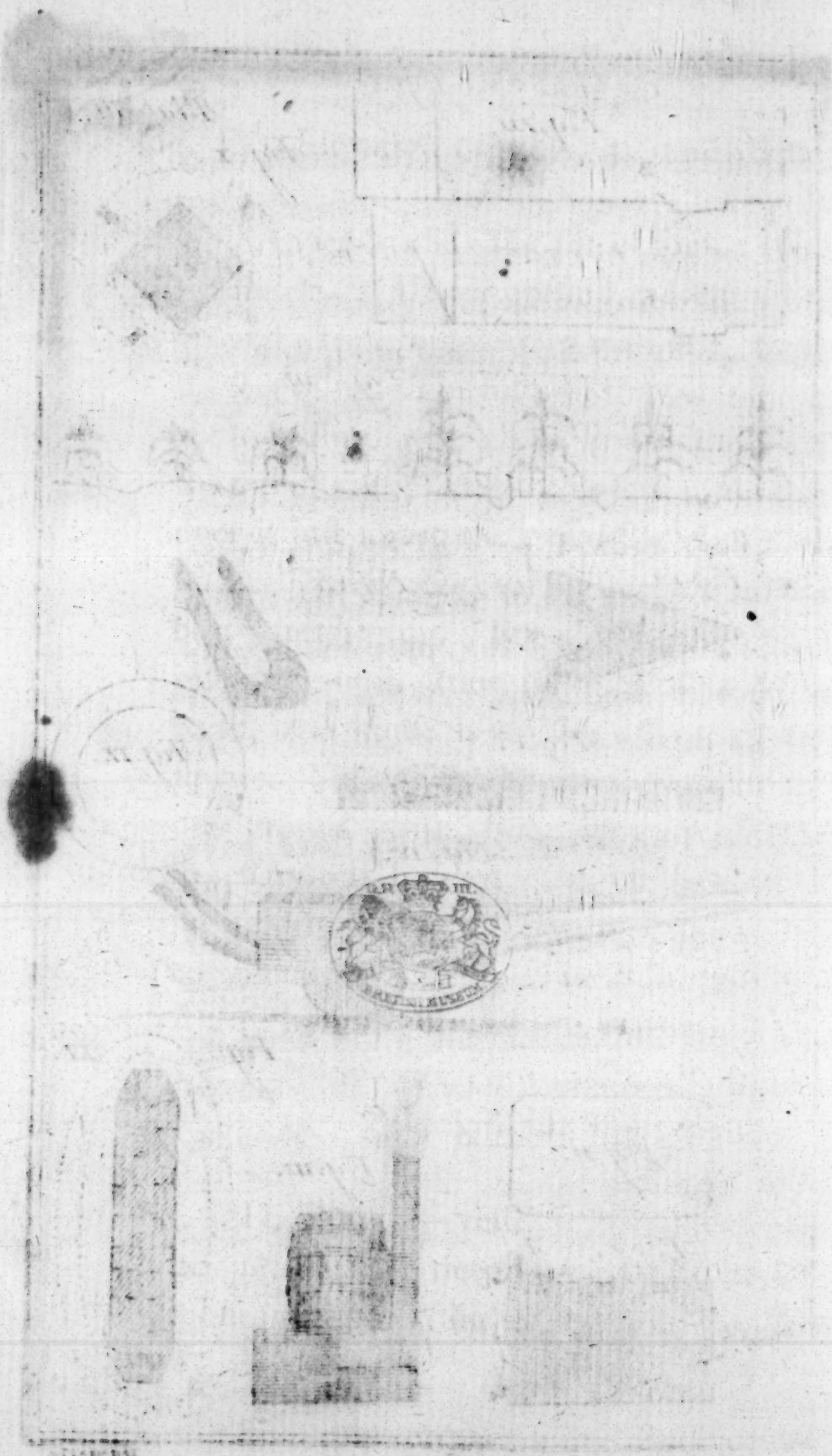


Plate III.

H.W.W. sc.



dotted lines are where the perforated moveable bottoms are placed. In *a* is the *water or wort:* *b* contains the *malt:* and into *c* the warm water is pumped up from *a* and paſſes through; and often returned on the malt waſhes out its ſubſtance. The liquor is then boiled in *a.*——*a* A ſmall pump, mine is of metal. Mr. M'Cauley, Front-ſtreet Philadelphia, made my brewing veſſel of copper; the ſhape of fig. 2. Saying that copper ſheets cannot be bent angularly. At the bottom is a cock, in one ſide of the veſſel.

Fig. III. A root ſteamer. *a* Brick ſtove, having a *pot or kettle* fixed in it. Over the pot is a *hogshead, butt or caſk;* or an half of either, open at top, with the bottom full of inch holes, for letting the ſteam up amongſt the roots. Potatoes, &c. are to be waſhed clean in baſkets, or otherwiſe, before ſteaming them.

Fig. IV. Clover ripple. Wheels 16 inches diameter: box 18 inches deep: handles 3 feet

feet long, 22 inches apart: ripple 13 inches long.

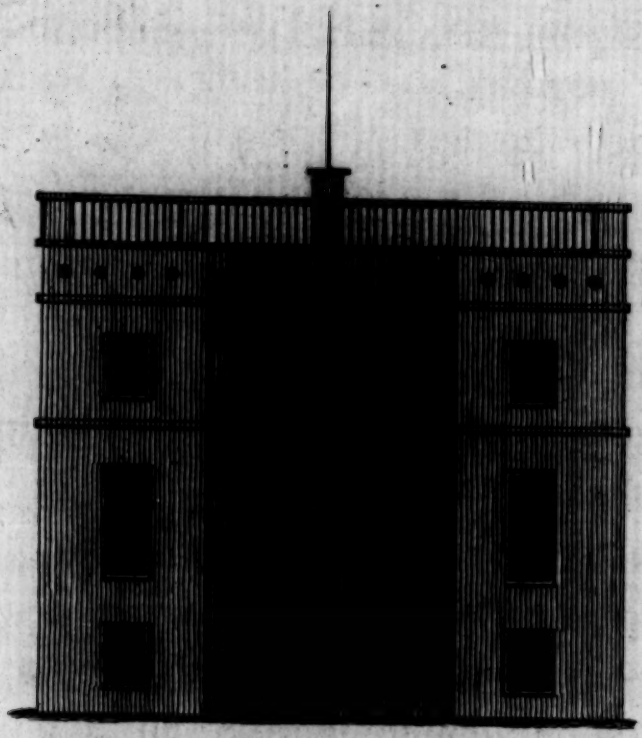
Fig. V. Bottom of the clover-ſeed box, mentioned page 102, with its diagonal holes and diviſions.

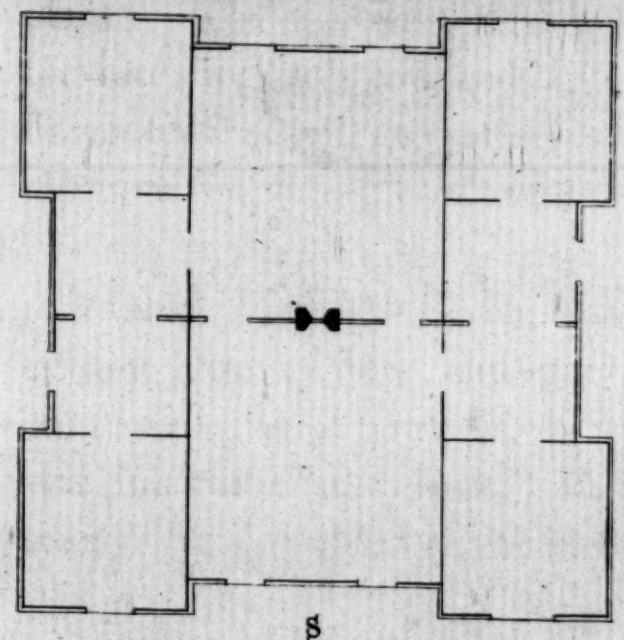
Fig. VI. A ſhim blade or hoe, for ſtony land. *a a* 22 inches long—— *b b* 14 inches wide, with mortiſes for ſide pieces, and a large one for a ſheet or ſtanchion. A ſtrip of iron or board is occaſionally fixed on each ſide, for edging up a little earth to the plants. The middle mortiſe is to be long, for receiving a broad and ſtrong ſheet or ſtanchion that will carry the blade without aid from the ſide pieces, when occaſion.

Fig. VII. A ſhim blade: ſuch as I uſed in ground clear of ſtone and gravel; gently convex to give it ſtrength, beſides that it was ſubſtantial at its back. Its ſide pieces were of iron, welded to the blade.

Fig. VIII.

*Plate.IV.*





S

Fig. VIII. *Beds* of wheat quite flat, as they appear on ſowing and covering wheat, whilſt maize is on the ſame ground, ripening. Alſo *ridges* of wheat ſown, as in common, after cutting off the tops of the maize plants.

Fig. 8. Treading floor; with horſes running promiſcuouſly.

9. Improved floor; with barn in the middle.

10. Mr. Singleton's floor, and houſe in the middle.

11. Cattle ſtalls. N° B. according to Mr. Bakewell. N° S. according to Mr. S. a Yorkſhire gentleman.

## PLATE IV.

Plan and Elevation of a country habitation, according to page 338, of the work.

# INDEX.

## A


PAGE.

AGRICULTURE-Society . . 434
Aſs . . . . . 531
American crops . . . . . 36
Apportionment . . . . . 229
Arms and ammunition . . . 318, 378
Apricot . . . . . 583


## B


Barns . . . . . 158, 95
Bacon . . . . . 453
Bramble fence . . . . . 558
Blades of Maize . . . . . 126, 290
Beans . . . . . 50, 52, 115, 532
Beer . . . . . 85, 386, 475
Beef, pickled . . . . . 453
—— dried . . . . . ibid.
—— barreled . . . . . 493
Bread . . . . . 457
Breed of ſtock . . . . . 211
—— croſſing the ſtrain . . . . 30
Beds of wheat . . . . . 104, 117
Brewing . . . . . 397
Biſcuit . . . . . 454
Brine . . . . . 332, 462
Boots water-tight . . . . . 557
Bugs . . . . . 462, 299
Buſhel . . . . . 527
Buckwheat . . . . 42, 54, 61, 135
Butter . . . . . 501, 511
——— from Chineſe cows . . . . 196
——— Engliſh cows . . . . 199
——— to clean from milk . . . 333
——— freſh in kegs . . . . ibid.

C

PAGE.

Cattle . . . . . 168
—— kinds . . . . . 191
—— kept . . . . . 70
—— fattened . . . . . ibid.
—— houſed . . . 64, 142, 144, 153
—— kept warm . . . . 164, 186
—— ſoiled, paſtured; kept or fattened . 168
—— paſtured and ſoiling compared . . 172
—— ſweated . . . . . 188
Cheeſe . . . . . 503, 507, 508
Cellars . . . . . 529
Cement floors . . . . . 341
Chinches . . . . . 462
Chinch bug . . . . . 299
Ciſtern . . . . . 464
Chimnies . . . . . 361
Courſe of crops defined . . . . 2
Crops . . . . . 58, 65, 82, 61
—— courſes in England . . . 22
—————— America . . . 36
—— exhauſting and ameliorating . . 24
—— often returning . . . . 31
—— with little plowing . . . 48
—— cabbage or roots between maize . ibid.
—— coſt apportioned . . . . 229
Clover . . . . . 98
—— on buckwheat . . . . 9
—— ſowed without covering . . 12, 107
—— often repeated . . . 28, 34, 76
—— to ſtand one year . . . 32
—— improvement of ſoil . . 77, 38, 278
—— ripple gatherer . . . 100
—— ſeed box . . . . . 102
—— with chopt ſtraw . . . 146, 179
Curd . . . . . 473
Curing proviſions . . . . . 522
Cyder . . . . . 85
Calves . . . . . 460
Candles . . . . . 469
Caſtor-oil . . . . . 502
Carrots . . . . . 539
Change of ſpecies and ſeed . . . 29, 31

PAGE.

Clay-manure . . . . . 65
Croſſing the ſtrain . . . . . 30
Cows . . . . . 155
—— Chineſe . . . . . 196
Commerce . . . . . 371

D

Draught of beaſts . . . . . 482
Drank . . . . . 73, 144, 146, 147
Dairy . . . . . 156
Diet . . . . . 339, 585
Diſtillation . . . . . 481
Ditch fence . . . . . 242
Dung . . . . . 73, 159, 170, 218, 75, 74

E

Experiments . . . . . 104, 124, 258
Eggs . . . . . 475
Education . . . . . 437, 550, 564
Engliſh crops . . . . . 22
Employment . . . . . 376

F

Farm-yard 84, 139, and offices . . . 65, 84
Fallows . . . . . 497, 24, 27, 227
Farms, near cities . . . . . 5
Farm, diviſion . . . . . 58
Flaxſeed-jelly . . . . . 190
Fences . . . . . 235, 558, 243
Freſhening proviſions . . . . . 486
Freſh-meat a year . . . . . 492
Fiſh . . . . . 464, 467
Food to live ſtock . . . . . 70, 72
—— of plants . . . . . 270, 273
Fly on turnips . . . . . 502
—— Heſſian . . . . . 67, 297, 299

G

Graſs rotations . . . . . 3, 9, 11, 20
Graſs . . . . . 512

PAGE.

Grain rotations . . . . . 22, 57
Gates . . . . . 533
Green dreſſing . . . . 54, 59, 281
Ground untilled . . . . 148, 170
Gypſum manure . . . . 417, 553
——— its ſtrength tried . . . 433

H

Habitations . . . . . 338
Hams . . . . . 453
Herrings . . . . . 467
Haws . . . . . 239
Hemp . . . . . 127, 549
Heat . . . . . 513
Heſſian fly . . . . . 67, 297, 299
Hedges . . . . . 558
Hills how to plow . . . . . 27
Hogs . . . . . 223
Horſe-hoing . . . . . 39
Homeſtead . . . . . 85
Horſe . . . . . 154, 163
Hops . . . . . 395

I

Ice-houſes . . . . . 88, 364
Ice-creams and ice . . . 364, 462, 513
Intimations on trade . . . . . 371
——— and notes . . . . 451
Income of a farm . . . . . 78
Improvements in agriculture . . 234

L

Land, impoveriſhed . . . . 76
—— reſtored . . . . 75, 77
Level . . . . . 476
Limeſtone manure . . . . 553
Liveſtock, houſed . . . . 91
Litter . . . . . 151, 149
Linſeed-jelly . . . . . 190
Lime-manure . . . . . 291

## M

PAGE.

Manure . . . 139, 417, 460, 552, 553
——— in rotation . . . . . 63
——— Aquamaque bean . . . . . 54
——— green dreſſing . . . . . ibid.
——— frequent and moderate . . . 67
——— to orchards . . . . . 492
——— how laid on the fields . . . 64
——— ſtraw . . . . . 294
——— Lime . . . . . 291
——— Turf-dykes . . . . . 294
——— how aiding to vegetation . . . 291
Maize . . . . . 116, 227, 523
——— a valuable corn . . . . . 41
——— cut up and piled . . . . 49, 123
——— ſtalks, a litter . . . . . 150
Madder . . . . . 528
Manufactures . . . . . 371, 374
Malt . . . . . 391
Meadow . . . . . 57, 65, 38
Meat, freſh a year . . . . . 492
——— ſalting . . . . . 522
Mills, to thraſh wheat . . . . . 586
Milk . . . . . 196, 197, 201
Melaſſes . . . . . 521

## N

Notes and intimations . . . . . 451
Neceſſaries . . . . . 299, 377

## O

Orchards . . . . . 85, 492, 567
Oxen, expenſe and income . . . 15, 57
———, in harneſs . . . . . 155
Orchard-graſs . . . . . 15, 57

## P

Paupers . . . . . 525
Platform roof . . . . . 341

PAGE.

Grain rotations . . . . . 22, 57
Gates . . . . . 533
Green dreſſing . . . . 54, 59, 281
Ground untilled . . . . 148, 170
Gypſum manure . . . . 417, 553
——— its ſtrength tried . . . . 433

H

Habitations . . . . . 338
Hams . . . . . 453
Herrings . . . . . 467
Haws . . . . . 239
Hemp . . . . . 127, 549
Heat . . . . . 513
Heſſian fly . . . . . 67, 297, 299
Hedges . . . . . 558
Hills how to plow . . . . . 27
Hogs . . . . . 223
Horſe-hoing . . . . . 39
Homeſtead . . . . . 85
Horſe . . . . . 154, 163
Hops . . . . . 395

I

Ice-houſes . . . . . 88, 364
Ice-creams and ice . . . . 364, 462, 513
Intimations on trade . . . . . 371
——— and notes . . . . . 451
Income of a farm . . . . . 78
Improvements in agriculture . . . 234

L

Land, impoveriſhed . . . . . 76
—— reſtored . . . . . 75, 77
Level . . . . . 476
Limeſtone manure . . . . . 553
Liveſtock, houſed . . . . . 91
Litter . . . . . 151, 149
Linſeed-jelly . . . . . 190
Lime-manure . . . . . 291

## M

PAGE.

Manure . . . 139, 417, 460, 510, 553
——— in rotation . . . . 11, 63
——— Aquamaque bean . . . . 54
——— green dreſſing . . . . ibid.
——— frequent and moderate . . 67
——— to orchards . . . . 492
——— how laid on the fields . . . 64
——— ſtraw . . . . . 294
——— Lime . . . . . 291
——— Turf-dykes . . . . 294
——— how aiding to vegetation . . 291
Maize . . . . . 116, 227, 523
——— a valuable corn . . . . 41
——— cut up and piled . . . . 49, 123
——— ſtalks, a litter . . . . 150
Madder . . . . . 528
Manufactures . . . . 371, 374
Malt . . . . . 391
Meadow . . . . . 57, 65, 38
Meat, freſh a year . . . . 492
——— ſalting . . . . . 522
Mills, to thraſh wheat . . . . 586
Milk . . . . . 196, 197, 201
Melaſſes . . . . . 521

## N

Notes and intimations . . . . 451
Neceſſaries . . . . 299, 377

## O

Orchards . . . . 85, 492, 567
Oxen, expenſe and income . . 15, 57
———, in harneſs . . . . 155
Orchard-graſs . . . . 15, 57

## P

Paupers . . . . . 525
Platform roof . . . . . 341

PAGE.

Patent right . . . . . 377
Peas . . . . . 52, 532
Peach trees . . . . . 581
Prison diet . . . . . 585
Potatoes . . . . . 227, 59, 147, 230
Ponds . . . . . 467
Pokemely . . . . . 470
Power of beasts . . . . . 482
Pottery . . . . . 514
Poor . . . . . 525
Plows . . . . . 534, 121, 122
—— double mouldboard . . . 121, 122
Products . . . . . 69, 78
Plowing from and to maize . . . 119, 124
Poaching ground . . . . . 148
Provisions to cure . . . . . 522
Pruning . . . . . 569
Pasturing and soiling compared . . 172

R

Rennet . . . . . 472, 508
Rice . . . . . 335
Ridges . . . . . 104
Rotations . 1, 2, 9, 65, 544, 11, 32, 65, 81
Roots . . . . . 59
Rolling . . . . . 266
Rust of wheat . . . . . 556
Ruta-baga . . . . . 30
Rye-hay . . . . . 8

S

Stalls . . . . . 165
Salt . . . . . 318, 205
—— refined . . . . 320, 325, 330
—— washed . . . . . 327
—— lick . . . . . 94, 189
Salting provisions . . . . . 522
Swamps . . . . . 480
Shade . . . . . 53, 144, 148
Stacking in fields . . . . . 144
Sandy soil . . . . . 279
Sheep . . . 73, 145, 178, 207, 459, 485

PAGE.

Species, change of . . . . . 29
Seed changed . . . . . ibid.
—— box . . . . . 99, 102
—— made to grow . . . . . 239
Steers . . . . . 154
Steaming potatoes . . . . . 147
Spirit from potatoes . . . . . 386
Shim . . . . . 51
Swill . . . . . 144
Silk . . . . . 300
Shoes water-tight . . . . . 557
Soiling . . 143, 147, 168, 176, 172, 179
Sows and pigs . . . . . 156
Soil improved . . . . . 75, 77, 278
—— impoverished . . . 273, 292, 184
Sugar . . . . . 6, 521
Stuffing for leather . . . . . 557
Sugar maple . . . . . 5
Stubble, chopt for litter . . . . 149
Systems in business . . . . 1, 12

T

Thrashing mills . . . . . 586
Treading out grain . . . . 98, 245, 490
Trench-plowing . . . . . 63, 65
Treading ground close . . . 148, 218
Timothy grass . . . . 13, 14, 16, 57
Timber . . . . . 235, 236
Tobacco . . . . . 128, 135, 184
Thorn seedlings . . . . . 240
Turnips . . . . 30, 486, 502, 539

W

Watering ponds . . . . . 467
Wash for wood or stone . . . . 523
Water to drink . . . . . 545
Wash, a food to cows . . . . 144
Wheat on clover 107. In clusters . 111
Wheat . . 116, 542, 114, 259, 269, 296
——— top dressed and rolled . . 67
——— Macro's sowing . . . . 108

PAGE.

Willow . . . . . 478
Wine . . . . . 300
Wood to ſeaſon . . . . . 517

V

Vegetation . . . . . 270
Veals . . . . . 451
Vetch . . . . . 53
Vinegar . . . . . 455

Y

Yeaſt . . . . . 499, 500